

Active Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces

ARNIS AZIZ

B.A. (Hons) Industrial Design, M.Sc. (Integrated Design Studies)

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Lancaster Institute for the Contemporary Arts,
Lancaster University, United Kingdom.

ABSTRACT

Urban public spaces are vibrant and ever-changing areas that accommodate a diverse range of human activities. However, the intensity and variety of these activities can differ significantly, even when the exterior conditions are comparable. The discipline of public life studies centres on understanding the behaviours and actions of individuals in public spaces and providing concepts to predict and enhance public participation. This study examines the social activities in urban public spaces surrounding retail locations, employing approaches derived from other scientific investigations. The study involved an audit of 17 street seating designs in Manchester and Liverpool. More than 30 hours of observation were conducted, using one-hour behavioural maps to document the various public activities. Recordings were made of multiple activities, including conversing, eating, sitting, and lingering. Additionally, 199 questionnaires were distributed to individuals using street seating to collect their preferences and evaluate the existing street seating designs. Conducting open interview sessions with experts in this field who had relevant knowledge and experience came next. The study was enhanced by conducting participatory design workshops that included experts and individuals from broad public backgrounds, which collected a wide range of user opinions and suggestions. The results emphasise the crucial significance of street furniture design, especially street seating, in promoting active social behaviour and social sustainability in urban spaces. Street seating has a practical purpose, facilitating social sustainability activities rather than being purely ornamental or a part of the urban character. This study concludes by dividing concepts, observations, actions, keywords, themes, and hypotheses into five main thematic factors that promote *active behaviour for social sustainability through the design of street seating in urban public spaces*.

Keywords: Urban Public Spaces, Social Activities, Street Seating Design, Public Participation, Social Sustainability

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*I love you with all my heart, and May Allah SWT bless me with His highest degree;
amen... Loves, **ARNIS AZIZ***

DECLARATION

I declare that this thesis is my own work and has not been submitted in substantially the same form for the award of a higher degree elsewhere. To the best of my knowledge, it does not contain any materials previously published or written by another person except where due reference is made in the best.

ARNIS AZIZ

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GLOSSARY OF TERMS

A I	Accessibility & Inclusivity
A V	Aesthetics & Visual Appeal
CTA DI	Craftsmanship, Timeless Appeal & Design Influences
C I	Customizability & Integration
CPTED	Crime Prevention Through Environmental Design
DFBC	Design for Behavioural Change
EC F	Ergonomics, Comfort & Functionality
ED	Expert Design
EEM D	Energy Efficiency, Modularity & Dematerialization
ES CC	Economic, Sustainability & Community Centric Design
GBCI	Green Building Certification Institute
IO SBP	Innovation, Originality & Social Behaviour Promotion
LEED	Green Building Rating System
MS D	Materials; Sustainability & Durability
PDW	Participatory Design Workshop
PIS	Participant Information Sheet
POP	Private Owned Public Space
POS	Public Open Space
PSPL	Public Spaces Public Life
TBL	Triple Bottom Line
USGBC	United States Green Building Council
WCED	World Commission on the Environment and Development

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CHAPTER 1

INTRODUCTION

This thesis aims to develop an understanding of how street seating design in city public spaces might contribute to active behaviour for social sustainability. It explores the meaning of sustainability and how it can be achieved through the concept of a sociable street in depth. This thesis has proven that the design of street seating that considers the social, behavioural, and physical aspects manifests the fundamental elements of sustainability – Triple Bottom Line with sociable street aspects, namely, social (space), behavioural (people), and physical (product).

1.1 Research Context

“Cities are the most common place for publics to meet and for human activities.”

(Gehl, 1987)

In the 21st century, achieving the vision of lively, safe, and sustainable cities that enhance well-being is a critical matter, as living activities bring people into public space (Ersalan, 2016). Previous studies have proven that cities are an essential place for the agglomeration of human activities, which involves numerous socialising activities. More specifically, human activities are the essence of each city, and each city is designated to enable people to walk, stand, sit, watch, listen and talk (Gehl, 2010). Street furniture, in particular, has the unique potential to facilitate or enable these activities to take place through its direct interaction with citizens. Furthermore, street furniture can be found in city areas where people interact with it on a daily basis (Lee & Lee, 2013).

Additionally, the presence of people in public spaces has long been considered an essential indicator of a healthy public life (Baker, 2011). Thus, it is proposed that there is the potential for innovation concerning street furniture to contribute to social

sustainability, thereby reflecting a more positive image of a city and encouraging positive behaviours (Rehan, 2013a). Sanches & Frankel (2010, as cited in Yucel, 2013) concluded that street furniture is significant when it is accessible to everyone and when its function is easy to understand.

However, despite the potential and vital role of street furniture, contemporary street furniture design has been identified as poorly planned in many instances, with the products being neglected or abandoned by users. The worst examples include cases of vandalism or the misuse of furniture due to a lack of understanding of the product or incorrect use of the facilities, which raises another safety issue (Tazilan, 2012; Wai, Siu, Sing, Wong et al., 2015).

According to Siu, 2005, street furniture has received criticism by many designers and theorists [Nielsen 1994, Whiteley 1995, Jordan 1997, Prudhomme et al. 2003, Clarkson et al. 2004] for biasing design towards functionality, and neglecting the psychological, cultural, social, and ideological factors [Bijker 1995, de Certeau et al. 1998, Norman 1998, Jordan and Green 1999, Orr 2002, Siu 2002, 2004]. Designers today spend very little time and effort studying the culture of users, the groups of users and how the designs relate to the users' behaviours, needs and preferences (Siu, 2005). Although the design for behavioural change has been explored and documented, applying this approach to promote a reduction in environmental impacts in product design remains relatively new and underdeveloped, highlighting a gap for this study, particularly concerning social sustainability (Niedderer et al., 2016).

Therefore, this research aims to deepen understanding of how street seating design in urban public spaces might promote active social behaviour to support social sustainability. It will examine user activity and interaction between street furniture and users, focusing on aspects such as street furniture design, services, space density, and the environment. The study will focus on street seating design, examining what designers consider and overlook during the process, and will explore the potential for encouraging social sustainability through design strategies that promote active behavioural change.

The outcomes of this research will provide survey-based evidence to inform the design and development of socially sustainable street furniture, particularly street seating. These insights will assist designers, planners, and relevant stakeholders in understanding how design strategies can encourage active and positive social behaviours in public spaces. Ultimately, fostering such behaviours can contribute to healthier patterns of urban living, enhance social well-being, and support broader sustainability goals within contemporary cities.

1.2 Research Objectives

In achieving the research aim, in the early stage of this research, the following objectives were realised:

1. To apply observation and interview methods to explore current street seating designs in Manchester and Liverpool.
2. To employ observational and survey studies to understand how public members use street seating in UK city centres.
3. To utilise surveys and participatory design workshops to establish the essential components that drive social behaviour via street seating design.
4. To use participatory design workshop and interview data to develop recommendations that emphasize the importance of active social behaviour through street seating design for social sustainability.

1.3 Research Question

The overarching research question of this study is *“How might street seating design contribute to active social behaviour for social sustainability in cities’ public spaces?”*. In particular, it can be divided into four sub-questions:

1. How does current street seating design affect active social behaviour in UK urban centres, such as Manchester and Liverpool?

2. How do members of the public use street seating in UK city centres?
3. What are the essential components for driving active social behaviour via street seating design?
4. How might we develop recommendations to emphasise the importance of active social behaviour for social sustainability through street seating design?

1.4 Theoretical Background

This research design draws on several theoretical disciplines, including design research methods, urban design, and the social sciences. The research design requires an understanding of three interrelated elements, which are presented in this section.

1. Sustainability – what sustainability is, in particular, what social sustainability means.
2. Urban Public Space – the role of the design of cities’ public space, the benefits of public space to the public members, in particular of social interaction, the public realm, and active social behaviour.
3. Street Furniture - the role of street furniture in public space, contributing to social sustainability, and in particular the street seating design that emphasises active social behaviour.

1.5 Thesis Structure

The thesis consists of 6 chapters:

Chapter 1 outlines the introduction to the research design, highlighting the initial observations of this research, followed by the research goals, questions, and objectives of the study, as well as the theoretical background of the research.

Chapter 2 describes the theoretical background for the thesis, utilising three interrelated elements to focus the literature discussion: sustainability, urban public space, and Street Furniture. It covers the areas of social sustainability research, social

interaction, public active social behaviour and street seating design. This chapter also presents the

Chapter 3 introduces the mixed method approach used in this research to address the research objectives by answering each research question. The research methods employed included observation, surveys, expert interviews, and a participatory design workshop.

Chapter 4 presents the findings and data analysis for all the methods employed in this research, followed by the application of the thematic analysis method. Themes are then connected with the three main themes of this research: Products, People and Space.

Chapter 5 presents the triangulation and discussion of all the themes before merging to create the group of factors that will be the novel contribution of this thesis.

Chapter 6 concludes the thesis and summarises the findings, outlining the novel contributions, followed by the research limitations and recommendations for future studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Comprehending the contexts of sustainability, urban public spaces, and street furniture is imperative to investigate the potential of street furniture designs to promote social sustainability and encourage active social behaviour (Allameh & Heidari, 2020; Asep Ahadiat Gandawijaya et al., 2021a; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022). This chapter begins with an overview of the history, evolution, and general definition of sustainability. To effectively address the research question, this study will also present the fundamental principles of sustainable development, with a particular focus on social sustainability. The investigation will define social sustainability and its relationship to urban design and public spaces. It will highlight its importance in promoting inclusivity and fostering social cohesion to enhance the community's overall well-being. Subsequently, the potential conflicts in diverse communities and the challenges associated with measuring social sustainability will be investigated. The research will also examine the determinants that affect social sustainability, including social equity, diversity, and participation. The intricate interplay of environmental, cultural, and socio-economic factors will also be investigated. The final section of this research is designed to suggest the central theme of the study, "Products, People, and Space," which has been adapted from other scientific studies. This theme aims to foster a more profound comprehension of the connections between these components and underscore the significance of promoting active social behaviour through the design of street seating to promote social sustainability. After thoroughly understanding social sustainability, the discussion will delve into urban public spaces. The subsequent section will explore the significance of the public realm in fostering social interactions and active social behaviour and the role of urban public spaces in cities.

2.2 Historical Evolution and the Emergence of Sustainability

The concept of sustainability has evolved significantly, shaped by increasing environmental awareness and the need for a balanced approach to development (Kuswanto et al., 2023). It originated from global concern over various environmental issues, including biodiversity loss, climate change, and pollution, which gained attention in the 1960s and 1970s. Rachel Carson's "Silent Spring" was the first to highlight the harmful effects of pesticides on the environment. It began when the sea became fishless, gardens and woodlands fell silent, and the sky was devoid of birds (1962). The situation worsened when humans faced chemical warfare, along with pollution, contaminated soil, water, and food. Since then, naturalists and scholars have promoted the environmental development movement (Carson, 1962). This era saw a growing awareness of the interconnectedness between human activities and natural ecosystems.

In 1972, the United Nations convened the first conference on the Human Environment in Stockholm, marking the first time global environmental issues were addressed. This conference established the United Nations Environment Programme (UNEP), which is still active. Subsequently, in 1987, the concept of sustainability was widely recognised by the World Commission on Environment and Development (World Commission on Environment, 1987), also known as the Brundtland Commission. Mentioned as "Our Common Future," it was published by several United Nations member states to raise awareness.

The growing concern about sustainability was further heightened when discourse began in the mid-1990s, mainly driven by environmental issues (Lilley, 2009). However, Stuart Hart, director of the Corporate Environmental Management Program at the University of Michigan, argues that "those who think that sustainability is only a matter of pollution control are missing the bigger picture" (cited in Elkington, 1999, p.71). He claimed that environmental tragedies, such as biodiversity loss, climate change, pollution, and other issues mentioned above, could lead to social problems and economic downturns. He added that these tragedies are linked to working conditions, safety, health, and poverty—non-environmental issues affected by

environmental catastrophes. Furthermore, he asserted that people cannot sustain their quality of life as human beings, protect the planet's biodiversity, or maintain ecosystems unless they address environmental tragedies.

Subsequently, sustainability has achieved extensive recognition, with numerous organisations and governments embracing its principles and implementing its practices. Currently, the Sustainable Development Goals (SDGs) are one of the primary principles guiding efforts towards sustainability. The SDGs are a comprehensive framework adopted by the United Nations in 2015, providing a global blueprint for achieving sustainable development by 2030 (The Sustainable Development Goals Report, 2021).

Bhamra and Lofthouse (2007) agree with this approach, emphasising that the ecological, social, and economic foundations of present and future societies must be protected by regulating the exploitation of natural systems. This perspective highlights the complex nature of sustainability, which includes maintaining economic profitability, promoting social equity, and preserving environmental integrity. The understanding and application of sustainability have greatly developed from 1987 to 2021. Therefore, the current research provides a brief overview of The Evolution of Sustainability as follows:

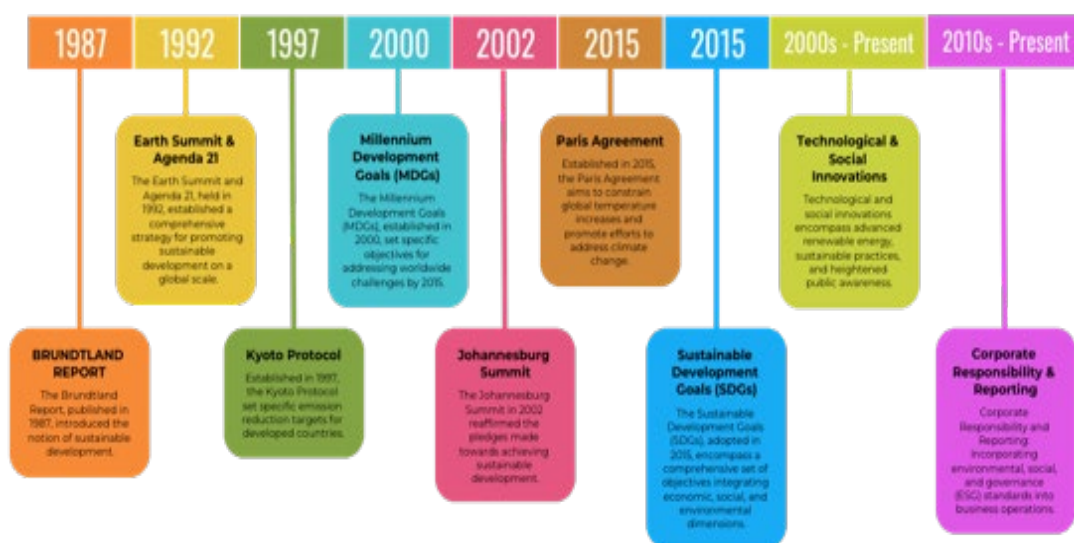


Figure 2-1: Demonstrates the notable progress achieved in sustainability over the past few decades, emphasising the changing comprehension and implementation of sustainability principles. Source: Author

The significance of sustainability continues to grow and can be viewed as a propelling force in fostering community development. According to Morelli (2011b), various experts and professions have made significant efforts to save the planet, with many defining sustainability in different ways to fit the context of each discipline and with different meanings to different people. This has sparked an acrimonious debate among academics. During that time, sustainability was a highly contested topic among scholars and industry professionals, with varying definitions and emphases (Altman et al., 2012). For instance, although Brundtland's definition is arguably the most popular, it is also the most controversial because it provides an imprecise definition of sustainability and favours development in the service of corporate interests. Following this, many scholars and experts have created more definitions.

However, the present research concludes that the benefits of sustainability are paramount, regardless of the excessive disagreement regarding its definition. All definitions highlight the necessity of maintaining a balance between conserving resources and generating future opportunities while meeting the current demand for growth.

2.3 The Definition

The term "sustainability" as we know it today first appeared in 1987 in the Brundtland Report, also titled "Our Common Future," produced by several UN member states (Document, 1988). The Brundtland Commission defined sustainability as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Altman et al., 2012, p. 155). This definition underscores balancing current developmental needs with preserving resources and opportunities for future generations (Keeble, 1988).

A renowned biologist, Ehrenfeld, defined sustainability as "the possibility that human and other life will flourish on the planet forever" (Ehrenfeld, 2008, p. 6), highlighting flourishing as the foundation of a sustainable future. This definition implies that sustainability involves creating conditions that promote health, vitality, and resilience,

enabling all forms of life to thrive indefinitely. Meanwhile, Lilley (2007) argues that sustainability depends on economic growth and development and the preservation of the environment to meet the needs of the entire community. This definition emphasises a holistic approach to living that balances environmental protection with economic and social progress.

Subsequently, Ehrenfeld's (2008) and Lilley's (2007) definitions are related, highlighting holistic living that considers the whole person—physical, mental, and social well-being—and their interaction with the environment. To promote overall well-being, sustainability is achieved by balancing economic growth, environmental protection, and social equity, which aligns with Bhamra and Lofthouse's (2007) definition. Moreover, Fleming (2013) asserts that this sustainability requires ideal, ethical, and valuable development to propel humanity to the next, more effective level of integration.

In the context of the present research, sustainability is defined through a comprehensive lens that incorporates diverse perspectives. This approach aligns with Bhamra and Lofthouse's (2007) definition of sustainability, encompassing ecologically, socially, and economically sustainable practices. Therefore, this research hypothesises that the design of sustainable street furniture should address environmental concerns and promote social interactions and economic benefits. This study aims to illustrate the potential of well-designed urban public spaces, mainly through street seating, to foster active social behaviour and enhance the overall well-being of communities by incorporating the principles of sustainable development.

Subsequently, despite countless definitions, there still needs to be a universally accepted definition of sustainability due to its ambiguity and the numerous debates and interpretations it elicits (Bevan et al., 2007). However, many definitions share principles similar to those exemplified by the 'Triple Bottom Line' (TBL) (Elkington, 2001). Nevertheless, present research contends with Tseng et al. (2020) that this is not necessarily a consensus because some scholars claim that the TBL should encompass supplementary dimensions beyond the conventional economic, social, and environmental aspects. For instance, Purvis et al. (2019) critically review the Triple Bottom Line (TBL) and its application to sustainability. The study acknowledges its

extensive use and intellectual significance but also indicates its limitations. The study added that the term is frequently overly connected with economic measurements and offers the concept of "sustainability pillars" as an alternate framework. However, this does not imply that they completely disagree with the TBL but see opportunities for refinement and additional growth to better express sustainability's multidimensional character.

Therefore, present research contended that this multifaceted approach guarantees that present needs are satisfied without compromising the capacity of future generations to access comparable resources and opportunities. The design of sustainable street furniture should address environmental concerns, promote social interactions, and provide economic benefits (Allameh & Heidari, 2020). Using the Triple Bottom Line (TBL) framework can benefit street seating design, considering sustainability's interconnected economic, social, and environmental aspects. Furthermore, the TBL approach ensures that street furniture design enhances the community's well-being and contributes to long-term sustainability by balancing these critical dimensions (Alhaddi, 2015a; Purvis et al., 2019).

2.4 Triple Bottom Line

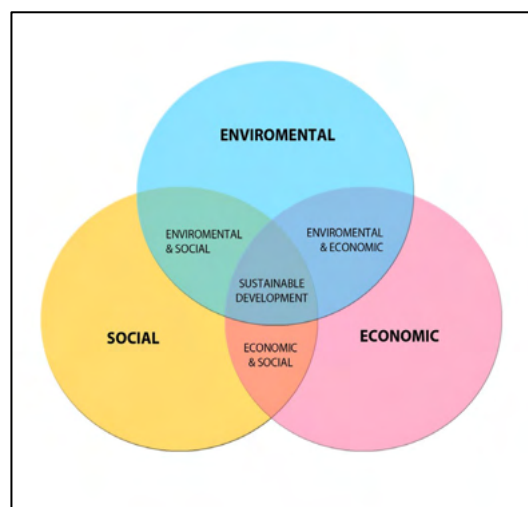


Figure 2-2: Illustrates TBL - Elkington 1997 cited in Lilley, 2007

The Triple Bottom Line (TBL) is a conceptual framework developed by Elkington (1999, 2001) that highlights the significance of considering the economic, social, and environmental aspects when pursuing sustainability objectives. Contrary to assertions about its diminishing importance, research indicates that TBL has sustained its credibility, as evidenced by a substantial rise in publications between 2015 and 2019 (Loviscek, 2021).

The Triple Bottom Line (TBL) concept extends beyond measuring financial results to evaluate sustainability on a broad scale, encompassing cities, countries, and the planet (Sarkar et al., 2009). It places a high importance on individuals' well-being, the health of the environment, and economic profitability. Elkington contended that attaining sustainability requires an integrated approach to all three aspects. He asserted that *"society depends on the economy – and the economy depends on the global ecosystem, whose health represents the ultimate bottom line"* (Fleming, 2013).

The TBL method advocates for a comprehensive and equitable design strategy that achieves financial gains while promoting environmental protection and social equality (Gao & Cui, 2022). Engaging stakeholders is crucial to improving public knowledge of sustainability concepts (Slaper & Hall, 2011). The TBL is commonly illustrated as three overlapping circles, symbolising the social, environmental, and economic aspects, sometimes referred to as the three P's: People, Planet, and Profit (Altman et al., 2012).

This study confirms that the TBL (Triple Bottom Line) is more significant in the context of sustainability, particularly from the perspective of designers. Adopting TBL (Triple Bottom Line) principles can effectively mitigate environmental impacts and offer significant societal benefits (Alhaddi, 2015b; Bhamra et al., 2011; Sridhar, 2011). To understand how design can enhance social sustainability, it is essential to have a solid grasp of the concepts related to social sustainability within the Triple Bottom Line (TBL) framework.

2.4.1 The Triple Bottom Line (TBL) Approach to Sustainable Design Development

The Triple Bottom Line (TBL) framework evaluates sustainability through the interconnected dimensions of economic, environmental, and social well-being. Within design disciplines, TBL offers a holistic lens for evaluating how interventions impact natural resources, cultural values, employment, and overall community quality of life (Gao & Cui, 2022; Gopalakrishnan et al., 2012; Hammer & Pivo, 2017; McDonough, 2002; Sesini et al., 2020). Scholars widely recognise that integrating these three dimensions into public space and street furniture design can enhance user well-being and support more liveable urban environments (Aziz, 2013; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Grabiec et al., 2022a; Mehta, 2014). As Samavati et al. (2024) highlight, well-being design emphasises inclusive, health-promoting, and sustainable environments, while Elkington (2001) stresses that economic value creation can further improve overall quality of life.

However, TBL also encounters practical challenges. Hammer and Pivo (2017) observe that its pillars often conflict or are challenging to measure, making balanced implementation complex. McDonough (2002) similarly states that stakeholder priorities frequently influence which pillar is emphasised, leading to uneven or superficial adoption. As a result, sustainability efforts may neglect deeper systemic issues or completely overlook one dimension, most often, the social dimension.

Despite these challenges, TBL remains a valuable framework for guiding public space design, especially when its social aspect is emphasised. Gao & Cui (2022) argue that integrating social sustainability into TBL results in more equitable, inclusive, and community-focused urban environments. Sustainable design investments also improve aesthetics, strengthen local identity, and boost the economy (Allameh & Heidari, 2020). Environmentally responsible practices, such as utilising renewable energy and recycled materials, will not only further increase ecological resilience but also enhance the user experience.

As demonstrated by Allameh and Heidari (2020), a comprehensive sustainability strategy provides ecological benefits, economic value, and an enhanced quality of life. When applied to street seating, this includes ergonomic furniture that supports physical health, aesthetically appealing environments that foster mental well-being, and material choices that reduce environmental impact. However, despite these apparent opportunities, recent studies (Allameh & Heidari, 2020; Gandawijaya et al., 2021; Ben Dhaou et al., 2022) show that street furniture design still seldom incorporates deliberate strategies to promote social interaction or active social behaviour.

This persistent gap highlights the uneven application of TBL, where the People dimension remains the least developed within street seating design. Although the framework calls for an equal balance of environmental, economic, and social values, the social pillar, particularly the promotion of social behaviour and community well-being, continues to receive limited attention. This gap underscores the need to examine social sustainability more closely, specifically how street seating can be designed to support active social behaviour. However, to pursue this, an in-depth exploration of social sustainability is needed to establish the conceptual foundation for understanding how social interaction, behaviour, and community dynamics shape the social value of urban public spaces. Therefore, by focusing on the social realm of TBL, this research contributes to a more holistic and balanced interpretation of sustainability within the design of street seating.

2.5 Social Sustainability

2.5.1 Introduction

Social sustainability is a critical component of the broader sustainability paradigm, aiming to balance economic, environmental, and social goals for the well-being of current and future generations (Erfaneh & Heidari, 2018). It emphasises social equity, human well-being, community development, and social inclusion, which develop a stronger sense of sustainability responsibility, leading to more sustainable practices (Moberg, 2016).

Literature indicates that social sustainability is commonly seen as a component of a more comprehensive sustainability framework that seeks to tackle the issues presented by environmental and climate change considerations (McKenzi, 2004). This paradigm encompasses social, economic, and ecological aspects, aiming to address major societal issues related to climate change and environmental dangers (Eizenberg & Jabareen, 2017a).

2.5.2 The Definition

Generally, scholars interpret the concept of social sustainability in various ways. Social sustainability refers to a society's ability to fulfil the requirements of both its current and future generations while simultaneously promoting social well-being, fairness, and equity (Rebecca L. H. Chiu, 2003). It involves encouraging the development of societies that include everyone, ensuring fair access to resources, and creating conditions that enable communities to thrive (Dempsey et al., 2011).

According to Allahdadi (2017a) and Allameh & Heidari (2020), social sustainability is often overlooked, especially in industries such as furniture design, because there are no clear and practical standards to guide it (Anderson et al., 2017; Jabbar et al., 2022). The primary focus at a global level has been chiefly on achieving economic and environmental sustainability (Corsini & Moultrie, 2021).

Furthermore, as highlighted by Dempsey et al. (2011) and Larimian & Sadeghi (2021), social sustainability in the context of urban public spaces involves creating and maintaining environments that promote social well-being, equity, and community development. This concept emphasises the importance of designing urban public spaces and furniture that are inclusive, accessible, and conducive to social interactions. Such designs ensure that all individuals have equitable access to resources and opportunities. Additionally, this approach fosters social cohesion, preserves cultural heritage, and enhances the overall quality of life through thoughtful urban design and inclusive public policies, as supported by the works of Colantonio (2007), Corsini & Moultrie (2021) and McKenzie (2004).

In summary, the definition of social sustainability in urban public space design for this study emphasises the importance of promoting social well-being, inclusivity, and equitable access to public spaces. By addressing concerns such as accessibility and social exclusion while encouraging active social behaviour, this definition aligns with the studies of Colantonio (2007), Corsini & Moultrie (2021) and McKenzie (2004). These perspectives also align with the current study's objectives of promoting social cohesion, encouraging community engagement, and preserving cultural heritage within urban environments, especially the urban life in them.

With this understanding in place, the next section will explore the significance of these principles and their practical application in the design and planning of urban public spaces. The discussion will focus on the role of these spaces in promoting social interaction, inclusivity, and cultural preservation, highlighting their importance in achieving broader social sustainability objectives.

2.5.3 Importance and Application in Urban Public Spaces

In recent years, social sustainability has gained prominence in academia and policymaking. Incorporating its principles into urban planning, corporate strategies, and public policies is essential. For instance, urban planners are encouraged to design inclusive public spaces that promote social interactions and community engagement, thereby enhancing social cohesion and well-being (Gehl, 2010; Jabbar et al., 2022).

Social sustainability also aligns with human rights and social justice, advocating for protecting vulnerable populations and promoting social equity (Janssen et al., 2021; McKenzie, 2004). This approach supports the United Nations' Sustainable Development Goals (SDGs), particularly Goal 11, which aims to make cities inclusive, safe, resilient, and sustainable (First Sustainable Development Goals (SDGs) Summit 2017, 2017).

From a broader perspective, social sustainability benefits should extend to ecological and economic spheres, making these benefits accessible and meaningful to local populations (Eizenberg & Jabareen, 2017a). The integration of social sustainability

into urban design presents practical challenges. Urban planners and designers must balance competing interests and navigate complex social dynamics to develop effective solutions. Gehl (2010) emphasises the potential of inclusive public spaces; however, their practical application often requires modification due to political and economic constraints. These issues reveal a research gap concerning practical challenges, which this study aims to bridge between theory and the actual application or integration of social sustainability.

While the SDGs provide a helpful framework, their implementation at the local level varies widely. This study aims to bridge the gap between high-level sustainability goals and ground-level practices, providing actionable insights for urban planners and policymakers. Evaluating the social components is difficult, which leads to social sustainability being the most overlooked element of the "Triple Bottom Line" (TBL). The lack of attention to this aspect has led to a need for more conceptual frameworks that specifically tackle the societal requirements in the field of product design (Dempsey et al., 2011; Margolin & Margolin, 2002).

Erfaneh and Heidari (2018) demonstrate that social sustainability benefits people, the environment, and the economy, aligning with social development and design processes. Integrating social sustainability into product design ensures that the design process contributes to holistic sustainability, aligning with TBL principles and fostering resilient, vibrant communities (Woodcraft et al., 2012). Despite its importance, social sustainability remains underdeveloped, particularly in urban planning. The current study highlights the need for a more rigorous approach to defining and theorising social sustainability and calls for research examining how the concept is deployed in planning and designing life cycles (Saffron).

2.5.4 Social Sustainability in Urban Areas

As scholars and social critics have recommended, the ideal strategy for social sustainability may begin with investigating outdoor social activities, such as those in urban public spaces. Corsini L. et al. (2021) indicate that although research on social sustainability is growing, the role of design is rarely discussed. However, urban design

and spatial planning offer some exceptions despite being domain-specific and separated from other fields.

Urban spaces play a crucial role in shaping individual and community happiness. Understanding the factors that contribute to urban happiness is challenging due to the concept's complex and subjective nature, as well as the scattered nature of the relevant literature (Carmona, 2021; Whyte, 1980).

Janssen et al. (2021) emphasise that strategic planning for social sustainability in urban growth should focus on community engagement, stability, and a sense of place. Gehl (2006) advocates for urban public spaces that are accessible, welcoming, and aesthetically pleasing to all demographic groups, as most social activities occur spontaneously in public spaces. Gehl posed important questions regarding urban life and space:

"What kind of life do we want here, what kind of spaces will be needed for this life, and finally, how can the buildings in this area be placed and formed to support these spaces and the life in this area?" Gehl (2006).

Mehta (2013) notes that by the mid-twentieth century, environmental psychology and behavioural science offered alternatives to the visual-aesthetic approach. Larimian and Sadeghi (2021) identified six primary dimensions of urban social sustainability: social interaction, sense of place, social participation, safety, social equity, and neighbourhood satisfaction. Examples, such as community gardens in New York, demonstrate how social sustainability initiatives can enhance air quality, biodiversity, citizen health, social interaction, public safety, and public investment returns (Colantonio, 2008).

Implementing social sustainability is not just beneficial for society but also contributes to business success. It can promote sustainable tourism, economic growth, and innovation by ensuring access to education, healthcare, housing, and other necessities (First Sustainable Development Goals (SDGs) Summit, 2017).

Despite its potential, social sustainability needs more transparency, verifiability, and comprehensive agreement. Political and policy commitment to social innovation is increasing; however, a gap remains between social innovation policies and academic research. Various definitions of social sustainability exist, often emphasising well-being across generations (Anderson et al., 2017; Jabbar et al., 2022). Jabbar et al. (2022) argue that "social sustainability" is a pluralistic and context-specific concept.

The current study highlights the importance of integrating societal demands into the design of street furniture, particularly street seating. Social sustainability promotes activities such as interacting, playing, eating, and lounging, which encourage well-being, create safe public spaces, and reduce vandalism and rough sleeping. These social behaviours will be further discussed in the following section.

2.5.5 Social Sustainability in Urban Public Space

Urban public spaces are crucial for fostering social interaction, promoting community participation, and enhancing cities' overall quality of life (Amir et al., 2020; Holland et al., 2007). As cities develop, urban design initiatives increasingly prioritise social sustainability, which ensures these spaces serve as centres for cultural interaction, community development, and social cohesion (Holland et al., 2007; Meijerink-Bosman et al., 2022). However, the successful implementation of these initiatives often requires addressing bureaucratic hurdles, funding limitations, and conflicting interests between public and private stakeholders (Carmona, 2019a).

Thus, addressing social sustainability in urban regeneration is essential, and a comprehensive strategy must be developed that considers the needs and perspectives of the local community (Dempsey et al., 2011; Janssen et al., 2021). Additionally, open public spaces in urban architecture can significantly enhance urban life by creating a welcoming atmosphere that fosters community and belonging (Andrzejewski & Salwa, 2020; Wirdelöv, 2022). The term "atmosphere" has two unique but interconnected meanings. Firstly, it is used scientifically to describe the gaseous layer that surrounds a planet. Secondly, it refers to a more abstract and sensory concept that incorporates the mood or ambience of a place or circumstance (Gandy, 2017).

According to Gandy's essay (2017), urban atmospheres are intricate and ever-changing, shaped by a multitude of sensory encounters and exchanges that occur within the city. These atmospheres possess both physical and affective qualities, which can provoke a range of emotional and psychological reactions in individuals and groups. This study concurs that these atmospheres influence emotional and psychological responses, which, in the context of this case study, are particularly relevant to user behaviours. Consequently, the current research examines the evolution and diversification of the concept of atmosphere, reflecting shifts in human understanding of space, subjectivity, and the physical world.

Thus, commercialising public spaces can sometimes undermine these efforts by prioritising profit over public accessibility, resulting in exclusive environments that marginalise certain groups. However, according to Oram (2018), to address this, a balance must be struck between the social, civic, and economic functions of public spaces, ensuring they remain inclusive and accessible to all community members.

Following that, improving urban public spaces also involves considering various elements beyond physical design, including activities, access, user characteristics, security, administration, maintenance, and place attachment (Ismail & Said, 2015). Cities that develop public spaces are committed to enhancing citizens' quality of life through the provision of adequate street space, green areas, parks, and recreation facilities (Andersson, 2016). However, with ongoing community engagement and adaptive management, these spaces can meet the population's evolving needs (Anderson et al., 2017; Andersson, 2016; Francis et al., 2012).

The current study posits that the concept of behavioural atmospheres explores ambiguous place-sharing, where neutral interactions between individuals are shaped by factors such as environment, time, and the people involved. Spaces such as public parks, residential areas, and street furniture offer insights into how these environments shape social dynamics (Wirdelöv, 2022). In conclusion, creating socially sustainable urban public spaces necessitates a comprehensive and collaborative approach that integrates flexible design, community involvement, and a balance of social, civic, and economic functions. Central to this approach are the principles of inclusivity and

equality, which enhance social behaviours and interactions within these spaces. The following discussion will focus on aspects of social behaviour.

2.5.6 Social Sustainability - Behaviour Aspects

In light of the previous discussion on the importance of social sustainability, this section draws on Mehta's (2013) street observational methodology to further explore the behavioural dimensions of socially sustainable public spaces. Mehta's work identifies three interrelated characteristics of social streets: **Social Aspects**, **Behavioural Aspects**, and **Physical Aspects**, which are based on detailed walk-by observational studies of people's activities in urban settings. These components collectively reflect the social dimension of the Triple Bottom Line framework and provide a valuable lens for understanding how public spaces can support social interaction, community life, and everyday behavioural patterns. The following subsections outline Mehta's summary of each aspect and examine their relevance to the design and use of street seating in urban public spaces.

Social Aspects

Social aspects are often overlooked in urban design guidelines despite being fundamental to how people experience and use streets. Mehta (2013) emphasises that these social qualities emerge from everyday interactions that occur in community gathering points such as small local shops, cafés, and neighbourhood services. These establishments act as informal social anchors where people encounter friends, family members, and strangers, spend leisure time, and participate in activities that strengthen their sense of belonging. When supported by suitable physical features, these local businesses significantly contribute to a street's vibrancy and sociability. As Solnit 2000 (cited in Johansen, 2005) notes, independent neighbourhood shops often evolve into community hubs that offer more than goods and services that they provide history, memory, local identity, and a shared sense of place. These social qualities are essential for fostering community cohesion and are closely tied to social sustainability.

Behavioural Aspects

Behavioural aspects relate to how people use streets for lingering, socialising, and engaging in everyday activities. Unlike parks or plazas, where such behaviours are expected, the extent to which streets support these activities largely depends on their land uses and management. Historically, older North American communities featured fine-grained commercial streets with diverse shops that encouraged social lingering and informal encounters. Studies have shown that lively, friendly, and varied commercial areas remain essential features of socially vibrant mixed-use neighbourhoods (Montgomery, 1998). In contrast, many modern developments fail to provide this dynamic mix; land uses are often segregated into distinct zones for living, working, shopping, and recreation, resulting in environments where facilities and public spaces are rarely shared. Montgomery (1998, p. 105) describes this condition as “oil and water,” where activities are physically close but socially disconnected. Literature on urban design consistently advocates for mixed-use patterns with subtle horizontal and vertical variation, as these support routine encounters and enhance the everyday social life of streets. These behavioural patterns are central to understanding how design features such as street seating can facilitate active social engagement.

Physical Aspects - Physical aspects relate to the environmental and structural features of streets and neighbouring buildings that influence sociability. Elements such as permeability, façade articulation, personalisation, signage, and street furniture add to the visual variety and sensory richness of the street setting. Research on environmental perception indicates that sensory diversity and complexity increase people’s engagement with a place by making it visually appealing and stimulating. Although aesthetic preference matters, Mehta (2013) contends that physical features must also support interactional needs by providing suitable spaces for people to pause, linger, gather, and socialise. Well-designed physical environments, therefore, facilitate both movement and stationary activities, creating opportunities for spontaneous encounters and fostering a sense of community presence. These physical qualities are crucial for developing socially sustainable streets that promote everyday participation and active social interaction.

Since socially supportive behaviour relies not only on spatial design but also on the equitable treatment of diverse users, achieving true social sustainability requires

environments that are accessible, inclusive, and responsive to different needs.

Building on these principles, the next section discusses the importance of inclusivity and equality as core elements to ensure that urban public spaces are welcoming and usable for everyone in the community.

2.5.7 Inclusivity and Equality

Inclusivity and equality are fundamental to social sustainability in urban public spaces. These principles ensure that spaces are accessible to all users, regardless of age, gender, social situation, or physical ability (Dempsey et al., 2011). Features such as wheelchair ramps, tactile pavements, and bilingual signs enhance accessibility, while diverse activity areas cater to different needs (Langstraat & van Melik, 2013; Nogueira Lopes, 2015). Despite these efforts, some cities require assistance with uneven implementation, where certain areas may receive more attention and resources than others, thereby perpetuating existing inequalities (Weder, 2023).

Promoting inclusivity involves creating environments where every community member is valued and can actively participate (Madanipour, 2010). Inclusive and accessible (Wall, 2022). Community engagement initiatives that seek feedback from various demographic groups and programmes that celebrate cultural diversity help achieve this goal (Anderson et al., 2017). However, genuine inclusivity requires more than token efforts; it demands sustained commitment and actions that address systemic barriers to participation. While inclusivity and equality lay the groundwork for socially sustainable urban public spaces, fostering social interaction and community engagement are equally critical to this endeavour.

Social interaction is crucial for social sustainability, fostering community, and vibrant urban life (Dempsey et al., 2011; Meijerink-Bosman et al., 2022). Public spaces designed to support social interaction encourage spontaneous encounters and communal activities. Strategically placed seating, interactive public art, and social amenities like picnic areas and community gardens facilitate these interactions (Allahdadi, 2017b; Mamaghani et al., 2015; Oram et al., 2018a). However, the success

of these designs relies heavily on proper maintenance and the continuous involvement of the community.

Therefore, public spaces should accommodate a variety of social activities, from local gatherings to major community events. Flexible design elements, such as movable seating and multi-use open areas, adapt to different functions and encourage diverse social interactions (Mamaghani et al., 2015; Oram et al., 2018b). According to Rahman and Putri, experiencing today's living technologies can be advantageous if facilities like Wi-Fi access, charging stations, and public restrooms are enhanced or provided in public spaces, thereby improving their functionality and attractiveness, and promoting social engagement (Allahdadi, 2017a; Mamaghani et al., 2015). However, these amenities alone are not enough; effective management and fair distribution are essential for achieving social sustainability.

2.5.8 Conclusion

Overall, the literature emphasises the crucial importance of designing urban environments that prioritise inclusiveness, equality, and social participation. These principles help ensure that public spaces remain welcoming and accessible to people from diverse socio-economic backgrounds, physical abilities, and cultural identities. Urban planners can support this goal by incorporating accessible ramps, textured pavements, flexible seating, and spatial arrangements that accommodate a diverse range of activities.

However, achieving genuine inclusion and equity goes beyond just physical infrastructure. It requires ongoing community engagement and a sustained effort to address systemic barriers that limit participation. Initiatives that regularly seek input from diverse demographic groups and celebrate cultural diversity are vital for fostering socially cohesive environments. The literature further emphasises that social interaction is crucial for strengthening community bonds and fostering vibrant urban life.

Strategic placement of seating, interactive public art, and well-managed social amenities can significantly enhance community cohesion by encouraging spontaneous encounters and collective activities. The figure below illustrates a simple example of how social sustainability is integrated into the design of seating:



Figure 2-3: Illustrates Cho Neulhae and Jaebeom Jeong's artwork pieces, the "Swingers", intending to create a chair to restore human relationships.

Nevertheless, the implementation of these principles is often hindered by unequal resource allocation, competing economic priorities, and bureaucratic barriers. Overcoming these challenges requires a collaborative and flexible approach that incorporates social, civic, and economic factors through continuous dialogue and community-focused planning.

As this section shifts to a broader analysis of urban public space, the insights gained from inclusivity, equality, and social interaction offer a valuable foundation. The next part examines the key elements of urban public spaces that promote social sustainability, providing a detailed analysis of how these environments can be designed and managed to improve community welfare, social harmony, and everyday social engagement.

2.6 Urban Public Space

Urban public spaces, such as parks, plazas, streets, and other communal areas, are essential for promoting social interaction, community engagement, and enhancing the overall urban environment (Amir et al., 2020; J. Li et al., 2022). The design and management of these spaces greatly influence the quality and character of social interactions that take place within them. Well-designed spaces can foster positive relationships in a transformative way (Anderson et al., 2017; Bravo et al., 2022).

Urban public spaces play a crucial role in reflecting the conflicts and changes of urban life, as well as representing the cultural practices, norms, and values of their communities, amidst rapid societal shifts and various pressures from the environment, politics, technology, and economy (Smith, 2015). These areas encourage interactions among people from different backgrounds, enabling unique and shared experiences with the built environment (Qi et al., 2024). Therefore, when exploring how public spaces are utilised, it is important to consider the diverse cultural perspectives and their contributions to the continuously evolving nature of these spaces.

2.6.1 Comprehension of the concept of public space

Creating public spaces that cater to society's diverse needs requires developing flexible and inclusive areas for all community members. Urban planners and designers are tasked with ensuring these spaces remain adaptable for current and future social interactions and progress. This section will examine different perspectives of public space based on relevant literature.

“Public space is defined as all places of public use, accessible by all and comprises streets and public open spaces. It excludes the non-built-up parts of public facilities and public commercial spaces” (UN-Habitat, 2018, p.11).

“Public spaces are built to offer places to socialise, work and travel through. It is a broad concept that suggests ‘openness’ of space; open for anyone who wishes to make use of it” (Machielse, June & Jansson, 2015, p.7).

Public space is mainly defined by its inherent public nature, although specific definitions and interpretations may differ. The current study describes public spaces as locations that are open and accessible to everyone, intended to support various activities such as socialising, working, and travelling (UN-Habitat, 2018a). Importantly, regardless of ownership—public or private—public spaces should be available to all, fostering equality and inclusivity. However, access might be regulated depending on the activities conducted within these spaces.

The study highlights that public space can be understood and interpreted from multiple perspectives, but its fundamental trait remains public accessibility. Therefore, this research agrees with the definitions outlined above and affirms that public spaces are designed to be open to all ages, enabling a range of activities such as socialising, working, and travelling (UN-Habitat, 2018b).

Designing public spaces to meet society's varied expectations requires creating adaptable and inclusive environments that address the needs of all community members. Urban planners and designers must ensure these spaces are responsive to both current and future social dynamics and developments (Aboutorabi, 2018).

As Carmona (2019b) notes, public spaces vary in form, ranging from informal street intersections to monumental civic structures. On a larger scale, formal public spaces have historically served as central hubs of settlements, acting as focal points for public life, activities, and events. On a smaller scale, public spaces may serve as areas for rest, congregation, or play, while also visually disrupting traffic flow through urban areas. These spaces include traditional squares, incidental urban areas, and various innovative types of public environments.

Furthermore, this study emphasises the importance of ensuring that all public spaces, whether publicly or privately owned, are accessible to everyone in the interest of equality. Although access to these spaces may be subject to activity-specific regulations, they should fundamentally remain open to the public without undue restrictions. The next section will explore different types of public spaces.

2.6.2 Type of Public Space: Privately Owned Public Space (POPS) and Public Open Space (POS)

Public spaces can broadly be categorised into two main types: **Privately Owned Public Spaces (POPS)** and **Public Open Spaces (POS)**. The concept of POPS originated in 1961 when New York City introduced an incentive zoning system that allowed developers to receive additional floor area in exchange for providing publicly accessible spaces, such as plazas and arcades. Jerold S. Kayden later expanded and popularised the concept in *Privately Owned Public Space: The New York City Experience*, where he analysed how privately owned spaces became part of the public realm (Kayden, 2000). According to Manifesty et al. (2022), the key difference between POPS and POS lies in ownership and management: POPS are privately owned and operated, while POS are publicly owned and administered by municipal authorities.

As part of the 1961 zoning amendment, density incentives encouraged private developers to create publicly accessible areas. POPS are thus privately owned and managed spaces that remain open to the public in exchange for benefits such as increased building densities or development flexibilities (*NYC Privately Owned Public Space History - DCP*, 2023). Although some POPS are relatively small, they can significantly enhance social value by offering opportunities for social engagement and informal interaction (Salim Ferwati et al., 2021). These areas appear in various forms, including outdoor plazas, indoor atriums, semi-public zones within office buildings, hotels, shopping centres, cafés, and amusement precincts. POPS may also host activities such as farmers' markets, art installations, and concerts (Bortoli, 2018; Kayden, 2000). As planning regulations evolved, POPS began incorporating amenities such as seating, landscaping, accessibility features, and safety measures, thereby improving their contribution to urban life. However, concerns remain that POPS may become exclusive or restrictive due to private rules governing access and behaviour (D. C. Marshall, 2022).

Despite their potential benefits, several POPS have historically lacked essential amenities or featured design elements that limited public enjoyment. Kayden's (2000)

review identified issues including insufficient seating, poor accessibility, and inadequate maintenance—problems often linked to outdated zoning criteria or insufficient design guidelines. These limitations contributed to the advocacy for clearer standards and better management practices (Carmona, 2019b). Manifesty et al. (2022) argue that the fundamental purpose of POPS is to provide comfortable and well-maintained spaces where private owners exercise flexibility and creativity. POPS can attract visitors, increase foot traffic, and strengthen economic activity (Bortoli, 2018) (Bortoli, 2018), while also safeguarding publicly accessible spaces within private developments (Bortoli, 2018; Kayden, 2000).

POPS offer multiple environmental, economic, and social benefits: improved access to urban greenery and amenities, increased property values, and opportunities for adaptable and creative design (Bortoli, 2018; Manifesty et al., 2022). These benefits also contribute to local economic growth through cultural promotion, tourism development, and social interaction (Siláči & Vitková, 2017a). However, POPS also carry political implications. Private owners often control access and behaviour, potentially limiting public use and creating tension between private interests and public rights (Carmona, 2019b). Since private owners are responsible for maintenance, POPS may also face underfunding or reduced upkeep (Manifesty et al., 2022). Unequal distribution of POPS across cities further contributes to spatial inequities. As Manifesty et al. note, “these POPS have a higher chance of being underused due to their uninviting design and the excessive restrictions imposed by the management body (p.22022).

In contrast, **Public Open Spaces (POS)** are publicly owned and managed, ensuring equal access for all users (Li et al., 2022; Mehta, 2009). POS provide multiple advantages, including spaces for civic engagement, recreation, and environmental restoration. These areas bring people together for shared activities and community events, contributing to social cohesion (J. Li et al., 2022). Despite these benefits, barriers such as social exclusion, perceived safety issues, or inadequate accessibility can limit involvement for certain groups (Carmona, 2010; Whyte, 1980). POS also face challenges including significant public funding requirements for construction, maintenance, and repairs. Regulatory constraints may limit design flexibility and

creativity, while overcrowding can lead to deterioration and increased maintenance costs (Carmona, 2021b; Funding Our Public Space, 2019).

In summary, both POPS and POS play critical roles in supporting social life and interaction within cities. The literature (Ben Dhaou & Vasvary-Nador, 2022; Bravo et al., 2022; Eraslan, 2016; Gehl, 2006; Carr et al., 1992) indicates that the key issue is not the type of ownership but the ability of these spaces to provide accessibility, inclusivity, and a high degree of “publicness.” This publicness is shaped by the rights and responsibilities that govern use and access, regardless of ownership (Carmona et al., 2008b). For the purposes of this study, the focus is on **Public Open Spaces (POS)** with widely accessible and governable structures, in order to examine how such spaces support social interaction in metropolitan contexts.

2.6.3 Exploration of the cultural, countercultural, and intercultural dynamics within urban public spaces.

According to Carmona (2019a), public spaces can include a variety of areas, from casual street junctions to large municipal facilities. On a broader level, official public spaces have traditionally acted as the perceived focal points of communities, hosting public life, activities, and events. These spaces can also serve specific localised functions, offering areas for relaxation, gathering, or recreation while visibly interrupting traffic flow in urban settings. Examples include conventional squares, accidental urban places, and innovative types of public spaces.

An overview of the cultural dynamics that shape urban public spaces. Urban public spaces are influenced by and reflect the cultural customs, standards, and principles of the nearby communities (Smith et al., 2015). These spaces serve as important venues for expressing and discussing different cultural identities, as people from diverse backgrounds interact with and engage in the physical environment (Smith et al., 2015; Milan & Oliva, 2014). Understanding these cultural dynamics is vital for grasping the evolving and dynamic nature of how public spaces are utilised, since various groups may have distinct expectations, interests, and approaches to shared space use.

Cultural practices and the utilisation of public space

Public spaces are heavily influenced by mainstream cultural standards, which shape their design, regulation, and daily use. Urban planners sometimes rely on traditional classifications and ideas when creating public spaces, even if these may not meet the needs and preferences of diverse communities (Maahsen-Milan & Oliva, 2014). Moreover, the research also shows that cultural norms play a crucial role in defining acceptable behaviours and activities in public spaces. These norms cover various aspects, including the proper use of space, interpersonal interactions, and the general etiquette that guides social interactions.

However, countercultural organisations, such as activists and subcultures, often engage with public spaces in ways that challenge or subvert the traditional functions of these venues. Countercultural groups add to the dynamic and contested nature of public spaces by creating alternative interpretations and uses for these environments (Smith, 2015; Ward Thompson, 2002).

Engagement of countercultural movements with public spaces

Countercultural organisations often utilise public spaces in ways that challenge prevailing cultural norms, creating alternative interpretations and altering perceptions of these areas. According to Carmona (2019a), these interactions demonstrate the contested nature of urban environments, where various social groups negotiate their positions and affirm their cultural identities. The countercultural use of public spaces such as protests, subversive art, and informal gatherings, emphasises the dynamic and constantly evolving nature of these settings. Moreover, they reveal conflicts that arise when marginalised or alternative groups claim their right to occupy spaces for their forms of communication, often in opposition to the dominant social hierarchy (Lesan & Gjerde, 2021).

Interactions between different cultures and their impact on social cohesion

As public spaces play a vital role in fostering intercultural exchanges; they contribute to social cohesion by encouraging interactions between different ethnic groups and bridging cultural gaps (Ganji & Rishbeth, 2020). Urban planners and designers face challenges when trying to incorporate multiple cultural perspectives into the planning

and management of public places (Aboutorabi, 2018). Nevertheless, Ganji and Rishbeth suggest that these challenges also present important opportunities for growth and development (2020). The study adds that well-designed public spaces can accommodate diverse cultural practices, thereby promoting social cohesion by creating places where different groups can gather.

However, there would still be a risk of conflict arising from disagreements over the use of space or differing expectations. Public spaces continue to play a crucial role in fostering inclusivity and mutual understanding among diverse communities. These places can serve as important hubs for cultural exchange, contributing to the development of more inclusive metropolitan regions that embrace a wider range of social and cultural activities (Carmona, 2019a).

Including diverse cultural perspectives in the planning and management of public spaces presents both challenges and opportunities. Although disagreements over space usage or conflicting expectations may lead to conflicts, incorporating different viewpoints allows for creating urban environments that are more inclusive and reflect a wider array of cultural practices (Lesan & Gjerde, 2020). The dynamic nature of public spaces, shaped by ongoing discussions between cultural and countercultural groups, highlights their importance as key sites for fostering intercultural communication and social interaction (Carmona, 2019b).

2.6.4 Public Space Responsiveness Towards Social Interaction

Public open spaces serve as platforms for social interaction and cultural discourse in urban environments (Mehta, 2013 & Zhang et al., 2022). Socially inclusive public spaces allow people of all ages and demographics to access essential services and amenities without physical barriers, safety concerns, or transportation difficulties. People are attracted to and tend to spend more time in public spaces that provide interest, stimulation, and some level of comfort (Zhang et al., 2022a). Cao and Kang (2019) study show that numerous architects, urban designers, and sociologists have long investigated public space attributes that facilitate social interaction, namely [Carr et al., 1992; Francis, 2003; Gehl, 2006; Jacobs, 1962; Lynch, 1960; Whyte, 1980].

Nevertheless, this section will continue to examine how public open spaces are amenable to social interaction, focusing on the intended users, activities, and cultural and discourse benefits resulting from these vibrant settings. In writing about this topic, one scholar wrote;

"Streets and sidewalks, the main public places of a city, are its most vital organs. Think of a city, and what comes to mind? Its streets. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull".

(Jacobs, 1992, p.29)

Most surveys and observational studies indicate that people value and seek out special events and activities in public spaces, both locally and remotely (Gehl Studio, 2018). Unique and special events, such as impromptu street entertainment, also attract the eye and help define fascinating locations (Holland et al., 2007). People are more likely to stay if there is a comfortable place to sit, especially if they are welcome with good weather and a pleasant atmosphere (J. Li et al., 2022). Therefore, the general social activity or exciting environment results from the number of people and the duration of their stay (Gehl, 1987, 2004; Mehta, 2013; Scinta, 2017). An exciting environment refers to a lively and dynamic public space where people engage in various social activities, interact with one another, and participate in communal events. Such environments are characterized by vibrancy, energy, and a sense of community (Gehl, 2010; Whyte, 1980; Mehta, 2014)."

Therefore, the general social activity or exciting environment results from the number of people and the duration of their stay (Gehl, 1987, 2006; Mehta, 2013; Scinta, 2017). An exciting environment refers to a lively and dynamic public space where people engage in various social activities, interact with one another, and participate in communal events. Such environments are characterised by vibrancy, energy, and a sense of community (Gehl, 2010; Mehta, 2014; Whyte, 1980).

A study by (Holland et al., 2007) found that activities involving users of various ages and genders demonstrated how adaptable urban public spaces are to different users and purposes. According to (Scinta, 2017), each man, woman, infant, and senior citizen

has a unique perception of the public space due to the impact that each activity has on their impression of the public space. (Chen et al., 2016) assert that public spaces can promote greater socialisation and enhance social effectiveness by providing a sense of what a specific community requires. Nevertheless (Carmona, 2019b) contends that not every public space will or should accommodate every community or every occasion equally, despite some asserting that failure to do so constitutes exclusion. Following this, (Ken & Katharine, 2007, pg. 2) asserts that a specific public space is dependent not only on the architect, urban designer, or town planner but also on the people adopting, utilising, and administering the space, "people make places, more than places make people."

Furthermore, Borowski (2014) also argues that social surroundings can encourage social interaction and give public members more confidence to appreciate and express themselves even when meeting new people; consequently, the *'feel-good'* buzz from being part of a busy space, the therapeutic benefits of quiet time spent on a park bench; places where people can express their culture and identities and learn about diversity and difference; and opportunities for children and adolescents to meet, play, or simply hang out (Ken & Katharine, 2007, p. 2). All of these contribute to forming local connections, which are the basis of a sense of community. As quoted from (Gehl, 2010, p. 118), *"good city quality at eye level should be considered a basic human right whenever people go in cities"*.

Thus, according to scholars, municipal public space is the first vital connection in the network of social interaction and tourist destinations (Amir et al., 2020; Mehta, 2014). It is the most accessible location and a destination with limitless possibilities for all. No prior acquaintance is required, and no tickets, reservations, registrations, or invitations are necessary.

Public spaces are accessible 24 hours a day, but peak visiting times often align with retail business hours. The surrounding retail and commercial activities significantly influence when and how people use these public spaces, as the presence of shops, cafes, and other businesses attracts more visitors during their operating hours (Askarizad & Safari, 2020; Oram et al., 2018a). During these times, the public can participate in activities, relax, take photographs, and appreciate the available public

spaces. Additionally, they can engage with others if they have something to say, a talent to demonstrate, or an opinion to share.

Therefore, it is crucial to understand the environmental and physical difficulties involved in constructing a new site or public place (Oram et al., 2018a; Siu & Wong, 2015b; Y. Zhang et al., 2022b). Public spaces will change as cities change, necessitating ongoing efforts to adapt and improve these spaces. Designers and decision-makers must continually work to renew urban environments for the benefit of citizens. It is essential to consider the perspectives of the user, the chooser, and the designer in creating and evolving public spaces.

2.6.5 The user, the Chooser, and the designer

As previously discussed, public spaces play a crucial part in facilitating social interaction, fostering community engagement, and contributing to the overall well-being of urban areas. To develop effective and comprehensive public space areas, it is essential to comprehend the roles and perspectives of key stakeholders. This section explains the significance of three critical actors in public space areas: the individuals utilising the space, the decision-makers accountable for its design, and the designers who conceptualise its layout. By analysing the contributions and interactions of individuals, one can gain valuable insights into the complexities and obstacles associated with the planning, administration, and utilisation of these public space areas.

- *The User*

Users are at the heart of public spaces; individual requirements, preferences, and actions influence the utilisation and vitality of these spaces. According to Carmona et al. (2019b & 2008b), designers can create public spaces that are both inclusive and functional by understanding user demographics, desires, and spatial preferences. Bambó Naya et al. (2023, p. 478) also mentioned “*Designing with users*”, which means including them in the management of public spaces. This allows designers to meet the diverse requirements of individuals and communities, including age, gender, or people's category. Also, according to Bambó Naya et al. (2023, p. 478), this favours

sustainability inclusiveness. Following the research of Pacheco (2017), there is a significant correlation between user happiness and well-being in communal areas and various factors such as social engagement, convenience of use, availability, and aesthetic appeal. This has been evidenced by their Project for Public Spaces (PPS), a non-profit organisation dedicated to assisting individuals in creating and maintaining public spaces. Therefore, it is crucial to have users participating and inputting in the utilisation of public spaces.

- The Decision-makers

Choosers are responsible for selecting and certifying public spaces' design, layout, and amenities. This group may include urban planners, policymakers, and decision-makers (Cornwall & Gaventa, 2000). They are crucial in determining said areas' expansive vision and objectives. When deciding, it is necessary to consider various factors, such as community requirements, the need for environmental sustainability, financial constraints, and regulatory compliance (Carmona, 2019a; Carmona et al., 2008). In addition, they must navigate the complexities of budgetary constraints, social equity, and public safety while balancing various interests (Mehta, 2014). According to (Abas et al., 2023), incorporating participatory approaches, which entail the participation of users and stakeholders, is crucial for ensuring that public spaces reflect the values and objectives of the communities they serve. This includes implementing collaborative decision-making processes that may result in more inclusive and context-appropriate public spaces.

Moreover, this could assist authorities in enhancing their responsiveness and accountability to users of public spaces (Carmona, 2019a). In her study *"Planning to Do Better Public Space"* (Carmona, 2019b, p. 49), he makes the following recommendation for decision-makers: *"Planners will need to be flexible enough to understand and embrace the evolving nature of public space and mindful of the important role of the range of public sector agencies that impact on the shaping of public spaces"*. The quality, functionality, and accessibility of these spaces are directly affected by their decisions. By implementing inclusive decision-making processes, decision-makers can ensure that public spaces accurately reflect the needs and aspirations of the community, resulting in the creation of vibrant, accessible, and inclusive environments that enhance urban life.

- *The Designer*

Designers are responsible for transforming theoretical ideas and concepts into tangible public spaces that serve a functional purpose, possess aesthetic appeal, and foster social inclusivity. According to Anastasiu (2021), experts in this discipline demonstrate expertise in urban design, landscape architecture, planners, and related areas of inquiry to create environments connected to the needs and preferences of their community. Generally, they typically employ sophisticated techniques during the design process, utilising design principles and methodologies to arrange public spaces, facilities, and aesthetics. They frequently draw upon scholarly research and theoretical frameworks to inform their design decisions (Design Council UK, 2011). Wever et al. (2008) stated that the designer who applies user-centred design methodologies knows it will entail combining feedback and perspectives from the users and stakeholders. By considering the findings of academic research, designers can also create public spaces connected to the varied needs and preferences of the community. Many public spaces and urban designers focus on integrating eco-friendly features and materials, as well as applying sustainable design principles, to address environmental sustainability concerns (Jelsma & Knot, 2002; Manzini, 2012; Morelli, 2011). However, it is essential to note that not all designers consistently adopt these practices, resulting in varying levels of sustainability in public space projects.

Many public spaces and urban designers successfully integrate eco-friendly features and materials, applying sustainable design principles to address environmental sustainability concerns (Jelsma & Knot, 2002). For example, designers like Jan Gehl have been known for incorporating green elements into urban spaces to promote environmental and social benefits (Gehl, 2010). However, it is important to note that not all designers consistently adopt these practices. Studies have shown that some projects still need to catch up in implementing sustainable measures, leading to varying levels of sustainability in public space projects (Allameh & Heidari, 2020; Ben Dhaou et al., 2022; Erfaneh & Heidari, 2018).

In conclusion, the literature emphasises that effective public space design requires a strategic and well-informed approach grounded in an understanding of how users interact with their environment. Studies by Allahdadi (2017), Allameh & Heidari (2020) and Mehta (2014), highlight that the most successful design strategies are those

that enhance user engagement, prioritise usability, and incorporate appropriate materials, technologies, and quality considerations. While these approaches are widely recommended, their relevance and application must be tailored to the objectives and context of each public space project.

The creation and stewardship of public spaces rely on the complementary roles of users, decision-makers, and designers. Users shape the life of public spaces through their presence and behaviour; decision-makers establish the vision, policies, and investment priorities that frame development; and designers translate needs and aspirations into functional, inclusive, and socially meaningful environments. Collaboration among these groups is essential to producing public spaces that are responsive to contemporary urban challenges and that genuinely support community well-being.

The following section examines the key guidelines, principles, and design elements that contribute to the creation of practical and socially responsive public spaces. It also identifies the measurement factors that are most relevant for evaluating public spaces capable of supporting active social behaviour.

2.6.6 A practical, open public space for active social behaviour.

Practical public space fosters engagement and discussion planned and unplanned encounters, and the development of diverse attitudes and beliefs (Mehta, 2014). Meanwhile, Gehl (1987) first suggested categorising outdoor activities as required, optional, and social to explain the optimal use and sociability of public spaces. Furthermore, Carr et al. (1992) argued that an ideal public space is responsive, democratic, and meaningful by incorporating empirical research.

As discussed above, public spaces are vital components of urban environments, shaping the quality of life and fostering social interactions within communities. However, what are the design principles that ensure the vitality of public space? How do experts rate these principles, guidelines, or factors? This section examines the essential characteristics of a good public space, drawing on insights from scholarly

sources and emphasising their importance in encouraging active social behaviour in urban public spaces.

El-Kholei and Yassein (2022) identified eight design principles for a vibrant, sustainable public space. Four of the eight design principles are fundamental, while the remaining four are cross-cutting. The initial four tenets are: 1) Public spaces should **encourage social interaction**, followed by 2) **Assure safety and security**, 3) **boost the local economy and funding maintenance**, and 4) the principle is to **protect the environment** so that ecosystems can recover and continue to provide services such as climate regulation, fresh water, sustenance, soil formation, and nutrient cycling. According to the researchers, these four factors support sustainable urban expansion. The remaining four cross-cutting design principles are (a) respect cultural diversity, (b) preserve historic value, (c) location, proximity and accessibility, and (d) design and aesthetics.

Meanwhile, a few studies (Carmona et al., 2008; Gomes, 2011; Langstraat & van Melik, 2013; J. Li et al., 2022) have defined four characteristics of ideal public space, namely 1) **ownership** - legal status, public accountability, 2) **accessibility** - day-to-day maintenance; security/control, 3) **management** - physical configuration and legal barriers to access; visual access and obstacles through design and 4) **inclusiveness** - diversity of uses and users; facilities; welcoming ambience.

Further, (Hanafi et al., 2013) have listed five elements towards higher quality cities: 1) **Lively City** - Social and cultural attractions in a vibrant city demonstrate the relevance of local public areas, 2) **Safe City** - Short walking distances, beautiful public areas, and a variety of urban space roles encourage walking and these boost city activity and security, 3) **Sustainable City** - "Green mobility"—walking, biking, or riding public transportation—enhances the sustainable city. These travel modes cut resource use, pollution, and noise, benefiting the economy and environment, 4) **Healthy City** - The desire for a healthy city is strengthened dramatically if walking or biking can be natural part of the pattern of daily activities and 5) **Attractive City** – The routine of people want to sit, stop, eat, and play in pleasant, multi-use spaces, high-quality spaces are more attractive, this, space is alive with a variety of activities.

Above all, Lynch's elements must be included here. The renowned urban designer and author of "The Image of the City" (Lynch, 1960) identified five key elements contributing to public space's quality and perception that help to aid in evaluating the design and experience of public spaces: **Paths:** Public space pathways. Walkways, trails, and sidewalks help establish circulation patterns. Well-designed routes are logical, easy to navigate, and link the space. 2) **Edges:** Public space edges are physical barriers. They can be buildings, walls, fences, trees, or bodies of water. Well-defined, attractive boundaries provide public spaces with a feeling of confinement, security, and identity. 3) **Districts:** Public spaces have different districts with their character, function, and identity. Plazas, meeting places, leisure areas, and cultural zones are examples. Districts enable people to navigate public spaces and offer varied activities and interactions. 4) **Nodes:** Public space hubs. Landmarks, squares, and crossroads attract people and serve as social and functional centres. High-activity nodes offer social contact, events, and public facilities. 5) **Landmarks:** Public landmarks provide guidance and identification. They might be buildings, sculptures, or natural features that help navigation.

Moreover, Pacheco (2017) lists ten principles for high-quality public space. 1) **Diverse uses:** Blending residential, office, and commercial uses, such as bars, restaurants, cafés, and local commerce, attracts people and makes the atmosphere safer and more pleasant. 2) **Active facades:** Connecting the sidewalk, street and ground level of buildings improves safety and urban design. People frequent visually appealing streets. According to (Jacobs, 1961), roadways and pavements show how public space is used and perceived. 3) **Social dimension and urban vitality:** Public space influences sociality as a collection of individuals. Wide, accessible streets, squares, parks, footpaths, cycle paths, and urban furniture promote environmental interaction, efficient space utilisation, and urban vitality. 4) **Human scale:** High-density development can harm health. (Gehl, 2006) found that individuals walk quicker in empty or inactive regions than in busy ones. Human-scale buildings make individuals feel like they are included in public space planning. 5) **Lighting:** Efficient, people-oriented lighting makes public places safer at night. Public lighting helps pedestrians and cyclists travel safely in the dark. 6) **Stimulating the local economy:** Quality public spaces provide leisure and living spaces and can strengthen the local economy. Walking and cycling are safe and appealing, making local commerce

accessible. 7) **Local identity**: Public spaces should be designed for the modest enterprises that define the neighbourhood's identity. However, local businesses and initiatives have long-term impacts and add character to the neighbourhood, whereas supermarkets and other chain corporations have minimal influence on the community. Planners of public spaces must consider the area's social dynamics and culture to establish a profound connection between people and place. 8) **Complete streets**: Public places should follow Complete Streets and "shared spaces" whenever practicable. Complete Streets are built for walkers, bicycles, vehicles, and public transit users. Complete streets have well-maintained sidewalks, bicycle infrastructure, street furniture and user-friendly signs. 9) **Green areas**: Vegetation improves air quality, lowers summer temperatures, and humanises cities by drawing people outside. Urban forestation reduces stress and improves well-being, making green public areas even more vital as cities get denser. Trees, plants, and flowerbeds aid urban drainage and biodiversity. 10) **Social participation**: Residents must be involved in designing, developing, and managing urban public areas and neighbourhoods to preserve their quality. Each community utilises public areas differently. Residents ensure that public space meets community requirements. A place will not be used or maintained unless it meets local needs. Safer, fairer public spaces require social involvement.

Mehta (2014, p. 58) has suggested a theoretical framework for evaluating public space, 'The Five Dimension Aspects of Public Space' called: 1) **Inclusiveness**, 2) **Meaningful Design**, 3) **Comfort**, 4) **Safety**, and 5) **Pleasurability**. The study found that "a good public space is accessible and open, meaningful in its design and the activities it supports, and provides a sense of safety, physical and environmental comfort and convenience, a sense of control, and sensory pleasure."

Last, research (Carmona, 2019) produced normative principles based on London and offers a simple and broad framework for planners and regulators to evaluate public space design and administration. On this basis, successful public spaces are: 1) **Evolving** - whether formal or informal, 2) **Diverse** - avoiding one-size-fits-all, 3) **Free** - with secure rights and responsibilities, 4) **Delineated** - public in their use, 5) **Engaging** - designing in active uses, 6) **Meaningful** - incorporating notable amenities and features, 7) **Social** - encouraging social engagement, 8) **Balanced** - between traffic

and pedestrians, 9) **Comfortable** - feeling safe and relaxing, and 10) **Robust** - adaptable and distinct in the face of change.

Understanding user needs is essential for developing better urban environments, as it encourages social interaction and active behaviours (Hanafi et al., 2013). Consequently, the quality of streets, parks, and other public spaces has a direct influence on daily life and well-being (Carmona et al., 2008a). Furthermore, most scholars highlight accessibility—which includes mobility, comfort, and landmarks—as fundamental guidelines, believing it can significantly affect the design of public spaces. Additionally, it considers social engagement across all age groups and user demographics, focusing on entertainment, culture, and identity.

This, in turn, encourages high levels of social engagement, which, according to previous research, can also enhance local economic impacts. Many studies also highlight principles related to the physical environment of public spaces, such as the facilities provided, the comfort of the setting, and the effectiveness of amenities in fostering community social activities. Finally, safety and security are regarded as essential principles, frequently emphasised by scholars (Allameh & Heidari, 2020; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Kiełek, 2022a). Having established the importance of these principles, the next section will examine issues and challenges that this study should identify as gaps requiring attention.

Source	Design Principles/Elements	Description
El-Kholei & Yassein (2022)	Fundamental Principles: <ol style="list-style-type: none"> 1. Encourage social interaction 2. Ensure safety and security 3. Boost the local economy and funding maintenance 4. Protect the environment Cross-cutting Principles: <ol style="list-style-type: none"> a. Respect cultural diversity b. Preserve historic value c. Location, proximity, and accessibility d. Design and aesthetics 	<p>Public spaces should foster community engagement and social connections.</p> <p>Spaces should be safe and secure for all users.</p> <p>Enhance economic activity and ensure sustainable maintenance funding.</p> <p>Support ecosystem services such as climate regulation, fresh water, and nutrient cycling.</p> <p>Embrace and reflect the cultural diversity of the community.</p> <p>Maintain and celebrate the historical significance of the area.</p> <p>Ensure spaces are conveniently located and accessible.</p> <p>Focus on the visual and functional quality of the design.</p>
Carmona et al. (2008b); Gomes (2011); Langstraat & van Melik (2013); Li et al. (2022)	Characteristics of Ideal Public Space: <ol style="list-style-type: none"> 1. Ownership 2. Accessibility 3. Management 4. Inclusiveness 	<p>Legal status and public accountability.</p> <p>Day-to-day maintenance; security and control.</p> <p>Physical configuration; legal barriers; visual access.</p> <p>Diversity of uses and users; facilities; welcoming ambiance.</p>
Hanafi et al. (2013)	Elements of Higher Quality Cities: <ol style="list-style-type: none"> 1. Lively City 2. Safe City 	<p>Social and cultural attractions; relevance of public areas.</p> <p>Short walking distances; beautiful public areas; diverse urban roles.</p>

	3. Sustainable City 4. Healthy City 5. Attractive City	Green mobility (walking, biking, public transport); reduced resource use and pollution. Integration of walking or biking into daily activities. Pleasant, multi-use spaces that encourage various activities.
Lynch (1960)	Elements Contributing to Public Space Quality: 1. Paths 2. Edges 3. Districts 4. Nodes 5. Landmarks	Pathways and circulation routes that are logical and connect spaces. Physical boundaries that provide identity and security. Areas with distinct functions and identities. Hubs and landmarks that serve as social and functional centres. Prominent features that aid navigation and provide identity.
Pacheco (2017)	Principles for High-Quality Public Space: 1. Diverse uses 2. Active facades 3. Social dimension and urban vitality 4. Human scale 5. Lighting 6. Stimulating the local economy 7. Local identity 8. Complete streets 9. Green areas 10. Social participation	Mixing residential, commercial, and other uses to attract people. Connecting ground-level spaces to the street to enhance safety and appeal. Wide, accessible spaces that promote interaction and vibrancy. Designing spaces at a scale that feels inclusive and engaging. Effective lighting for safety and usability at night. Spaces that support local commerce and encourage walking and cycling. Reflecting and supporting the unique character of the community. Designing streets for all users, including pedestrians, cyclists, and transit riders. Incorporating vegetation to improve air quality and aesthetics. Engaging residents in the design and management of public spaces.

Mehta (2014)	Five Dimension Aspects of Public Space: <ol style="list-style-type: none"> 1. Inclusiveness 2. Meaningful Design 3. Comfort 4. Safety 5. Pleasurability 	<p>Accessibility and openness.</p> <p>Design that supports meaningful activities and uses.</p> <p>Physical and environmental comfort.</p> <p>Providing a sense of safety and security.</p> <p>Sensory pleasure and enjoyment.</p>
Carmona (2019)	Normative Principles for Public Spaces: <ol style="list-style-type: none"> 1. Evolving 2. Diverse 3. Free 4. Delineated 5. Engaging 6. Meaningful 7. Social 8. Balanced 9. Comfortable 10. Robust 	<p>Spaces should adapt to changing needs.</p> <p>Avoid one-size-fits-all solutions; embrace diversity.</p> <p>Secure rights and responsibilities for users.</p> <p>Clearly public in their use and identity.</p> <p>Designing for active use and engagement.</p> <p>Incorporating notable amenities and features.</p> <p>Encouraging social interactions.</p> <p>Balancing traffic and pedestrian use.</p> <p>Providing a relaxing and secure environment.</p> <p>Adaptable and distinct in the face of change.</p>

Table 2-1: Design Principles and Elements for High-Quality Public Spaces

2.6.7 Issues and Challenges of Public Space

“Public space is the space where individuals see and are seen by others as they engage in public affairs” (Mensch, 2007, p. 1). This quote indicates that public space fosters considerable active social behaviour, especially in social settings, as these locations are vital for strengthening communities' social fabric and encouraging inclusive, vibrant urban environments. However, these spaces often face numerous challenges and issues that hinder their optimal use and impact. This PhD has identified four key challenges: 1) Design Challenges, 2) Management Issues, 3) Safety and Security, and 4) Inclusivity and Social Equity.

1) *Design Challenges*

Li et. al. (2022) highlights a significant disconnect between the theoretical understandings of social and political spaces and the practical, lived experiences within physical and material spaces. This gap is partly due to the insufficient exploration of the spatiality of the public sphere in political discourse. (Low & Smith, 2006) state that understanding public space is essential for understanding the public sphere and its social dynamics.

Hanafi (2013) argue that a major issue in developing public spaces is the lack of a thorough understanding of users' spatial needs. This shortcoming can result in designs that fail to meet community requirements effectively. Abdul Rahman et al. (2018), Siu & Wong, (2015) and Yücel (2013) emphasise the importance of urban design, which should be visually appealing, functional, and adaptable to the community's changing needs. Moreover, accessibility issues for persons with disabilities and older individuals pose significant challenges in public space design (Yang et al., 2022), potentially limiting both the accessibility and utilisation of these spaces.

As cities expand rapidly, new challenges emerge for designers. Kries (2006) and Sanches et al. (2010) note that urban growth requires the development of innovative strategies to meet the changing demands of public spaces. This involves designing urban elements such as street furniture that seamlessly blend into the urban landscape (Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022 and Mauk Sewandono, 2022).

Furthermore, Cairns (2018) identifies various urban elements including buildings, clusters, and the spaces between them, such as benches, chairs, streetlights, flower planters, bus shelters, bicycle stands, and rubbish bins that contribute to shaping an urban community or city. Inadequate public participation, limited resources, and insufficient planning further complicate the design of public spaces that accommodate diverse user needs and preferences (Khedr et al., 2022; Salim Ferwati et al., 2021). These factors often lead to suboptimal design choices that fail to address community requirements fully (Madanipour, 2010; Mehta, 2014). To overcome these challenges, a thorough understanding of both theoretical frameworks and practical considerations is vital, enabling the creation of inclusive, functional, and lively public spaces (Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Carmona, 2021).

2) Management Issues

As of today, many urban public spaces across the globe are modified in complex ways by multiple stakeholders, including government agencies, business organisations, and third-party actors. This complexity is particularly evident in the development and management of POPS and POS, where diverse interests and objectives intersect (Carmona, 2019a; Madanipour, 2010). For instance, public space provision is no longer a top priority for the government. Indeed, most post-war urban public spaces, especially those in the United States, were funded by the private sector (J. Li et al., 2022; Zamanifard, 2018). Kammersgaard (2021) states that “the division between private and public spaces has become increasingly blurred in recent years. Increasingly, the post-industrial city comprises ever more ‘retail spaces,’ such as shopping malls and other commercial entertainment venues, that dominate the public space.” For example, Chitrakar et al. (2017) found that control and commercialisation hinder public space accessibility and utility in Kathmandu's new communities.

Although some scholars agree that private sector involvement has benefited urban planning and management, it has also been criticised due to issues such as accessibility and equality (Ben Dhaou et al., 2022; Carmona, 2019a; Mauk Sewandono, 2022). This involvement has resulted in urban public spaces that are privately owned or controlled, such as POPS, which are subject to rigorous design and management. A substantial body of literature has argued

that private sector involvement in the provision of public space has undermined publicness, social diversity, and authenticity (J. Li et al., 2022; Zamanifard, 2018). *“Lack of management has led to the degrading quality of public space in modern cities around the globe. Contemporary public spaces face challenges in maintaining their status as 'social spaces' so that they are accessible and functional for users”* (Chitrakar et al., 2017, p.1).

Thus, the current study contends that maintaining the quality and functionality of public spaces, whether POPS or POS, requires a highly efficient management system. Dines et al. (2006) assert that insufficient maintenance, limited resources, and a lack of coordination among stakeholders may result in neglect and deterioration. Further, according to Tibbalds (2012), *“looking after towns and cities also includes after-care – caring about litter, fly-posting, where cars are parked, street cleansing, maintaining paved surfaces, street furniture, building facades, and caring for trees and planting.”*

Carr et al. (1992) identified that management issues are not an unfamiliar topic, stating that management includes waste disposal, maintaining green areas, and ensuring safety and security. Studies (Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Carmona, 2021; Chitrakar et al., 2017; Mauk Sewandono, 2022; Mehta, 2014) have shown that effective administration of public spaces necessitates appropriate governance structures and financing mechanisms, regardless of whether the public or private sector manages them.

3) Safety and Security

Chitrakar et al. (2017) asserts, among other things, that many modern cities have inadequate public space administration and maintenance, resulting in a loss of user convenience and safety. Coupled with inadequately and irregularly maintained public spaces, which make users feel unsafe and uncomfortable, public spaces have failed to attract people (Dempsey et al., 2011).

Based on an empirical analysis of other systematic literature, the current study concludes that ensuring safety and security in public spaces is crucial for fostering a sense of trust and well-being among users. Sadly, this is not always the case, as urban public spaces are frequently unprotected from crime and vandalism (Kiełek, 2022). This crime and vandalism,

as well as harassment, can discourage individuals from using and appreciating these areas. This may be due to the absence of appropriate regulations that impose excessive restrictions on people's behaviours and activities beyond standard social norms, thereby preventing potential unanticipated events (J. Li et al., 2022).

Whereas public spaces should benefit all city residents, (Kiełek, 2022) argues that access to these spaces is a big issue. This includes another group within the community; for instance, poorly designed streets make it difficult for wheelchair users or those with prosthetic devices to manoeuvre; they are also challenging to navigate without getting lost or confused due to unclear intersections caused by a lack of signage as well as a lack of parking spaces if required.

In addition to the above, deficient safety and security measures are frequently cited as a problem in public spaces, with inadequate lighting, surveillance systems, and security personnel contributing to safety concerns (Dastgheib, 2018a). Women with children, older people, and disabled users will pose the most significant concern. Most authorities may need to realise this, but according to Madanipour (2010). At the same time, some individuals dominate public spaces, others are fearful and feel insecure, causing them to withdraw from public spaces and socialise.

Nevertheless, current study suggests that implementing crime prevention strategies and incorporating well-established security measures are crucial for addressing these issues and enhancing the security of public spaces. Moreover, as stated (Kiełek, 2022), urban public spaces should provide safety and security for city residents and visitors because they can reduce crime rates, provide social opportunities, and promote healthy lifestyles.

4) Inclusivity and Social Interaction

An inclusive public space is often called a *"public space for all"*, actually means its democratisation, *"an open space with universal access"* understood as a *"common good"* (cited in Bambó Naya et al., 2023, p. 478). Crucial to ensure that public spaces are accessible because everyone should have equal access to the free, valuable resources they provide. However, public spaces are only sometimes designed

and managed with inclusivity in mind; consequently, only some receive the same results and benefits from using public spaces (Zhou, 2019). In such instances, the misuse of public spaces may result in authorities closing them or restricting their opening hours. Several local governments have determined that public space does not always benefit from unrestricted access, as they must limit some maintenance costs (Carmona & De Magalhaes, 2006).

According to Chitrakar et al. (2017), the authorities believed that making them completely accessible to the public was the issue. However, he opposed this because the dearth of access to public spaces has unquestionably resulted in the restricted daily use of public spaces. The current study supported this argument, as underutilised or "stealthy" spaces cost more to maintain. However, Holland et al. (2007) argue that even when they are physically accessible, other aspects of public spaces can present barriers to their use by specific individuals, including the location, the provision, and the absence of facilities to accommodate the community in public spaces.

Furthermore, according to Dines et al. (2006, p. 18), a lack of facilities can sometimes compromise the character of interactions between individuals, and he mentioned,

“An Indian woman was enthusiastic about the fact that she frequently bumped into old-time acquaintances on her local busy shopping street, but was frustrated that the absence of places to sit down (such as cafés with outdoor tables) meant that her fleeting exchanges could never turn into more meaningful encounters”.

Jacobs's (1961) research emphasised the substantial impact that facilities can have on the social liveliness of public spaces. If these problems persist, the number of individuals using the space for social activities is likely to decrease. This, in turn, could have a detrimental impact on the community's well-being, the local economy, and other associated aspects (Alonzi, 2022; Cao & Kang, 2019a; Holland et al., 2007; Siláči & Vitková, 2017b; Y. Zhang et al., 2022b). Furthermore, academic studies have proven that public areas that promote social inclusivity allow people of all ages to easily access necessary services and amenities without encountering physical obstacles, safety issues, or transportation difficulties.

Moreover, public spaces are to be shared and met, where everyone can express themselves and live individually and communally in their manner (Gehl Studio, 2018; UN-Habitat, 2018a). Thierry Paquot, an Urban Philosopher, posited in his arguments that communication, sharing, exchanges, and circulating signs are central to both approaches (cited in Body-Gendrot, 2013). Carmona (2019a) also argues that over the past decade, there has been a growing interest in shared spaces; for instance, adjacent communities are taking over the common areas of buildings, which can help strengthen social connections and promote diversity initiatives. As previously exhorted by (Gehl, 1987), authorities should focus on establishing new social ties that transform strangers into acquaintances.

These crucial issues encompass the absence of social contact and community involvement, restricted accessibility and inclusivity, poor safety and security measures, and insufficient maintenance and care. By acknowledging and resolving these shortcomings, communities may create dynamic, inclusive, and efficient public places, such as privately owned public spaces (POPS) and privately owned public spaces (POS), that cater to users' varied requirements and preferences. Thoughtfully planned street seating may promote dynamic social interactions by offering convenient and inviting spaces for individuals to assemble, communicate, and connect with their environment. This method improves the liveliness of urban surroundings and guarantees that public areas stay open and inviting to all community members, promoting a feeling of inclusion and community togetherness.

This PhD thesis addresses a need in urban public space planning by incorporating street seating to encourage social interaction. Many research investigations overlook the importance of well-designed seating configurations in urban settings for active social behaviours and community engagement. The goal of this venture is to promote active behaviour by promoting social sustainability and creating accessible, inclusive, and dynamic public spaces. This will be done with street benches. This research will advance urban designers and help planners and politicians improve public spaces. It seeks to unite and engage communities.

The following section will explore the impact of street furniture in raising public awareness of active behaviours for social sustainability, focusing on how street furniture transforms public areas and encourages social interaction.

2.7 Street Furniture

2.7.1 Introduction

Urban designers face the complex challenge of integrating street furniture into their designs in a way that balances functionality and visual appeal, ultimately enhancing the quality of life in cities. A vital urban design component, street furniture promotes social sustainability by encouraging interaction and accessibility in public spaces. According to Allameh and Heidari (2020), street furniture has a significant impact on the sustainability of urban environments. These elements shape the dynamic interaction between individuals and their surroundings (Lesan & Gjerde, 2020) and, according to Wirdelöv (2020), influence people's daily urban experiences. As a result, including innovative and strategic approaches to street furniture is essential for achieving social sustainability.

Despite its importance, street furniture has often been overlooked in recent years, resulting in the removal or underutilization of essential characteristics. This neglect has diminished public engagement and reduced the vibrancy of urban areas (Aziz, 2013; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Prvanov, 2017; A. Tazilan, 2012). Wirdelöv (2020) assert that the failure to approach street furniture from a sociological standpoint has contributed to this decline. Consequently, there is a need to reevaluate the role of street furniture, particularly in terms of how it enhances public spaces, supports social interactions, and influences urban environments.

This study emphasises the importance of street furniture in creating active and engaging urban spaces. By focusing on street seating, the research explores how design elements, materials, and placement contribute to social cohesion and the overall utility of public areas.

2.7.2 Definition and Understanding

What is street furniture? Street furniture includes many components intended to improve urban settings, fulfilling both functional and aesthetic roles. Multiple academic fields, such as architecture, landscape design, and urban design, utilise terminology such as "streetscapes," "urban furniture," and "microarchitecture" to characterise these components (Aziz, 2013; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; A. S. M. Tazilan et al., 2012). This study will employ the term "street furniture" as the principal designation for these vital urban landscape elements.

Street furniture, as characterised by numerous experts, fulfils functional purposes while enhancing the quality of urban life through its aesthetic value. Allameh and Heidari (2020) emphasise the importance of street furniture in promoting social sustainability by fostering connections and involvement within public spaces. Additionally, Gouvea and Mont'Alvao (2013) and Peyman and Gokcen Firdevs (2014) classify street furniture into six categories: decorative, service-oriented, recreational, commercial, signalling, and advertising. Comprehending these categories aids in recognising the many functions that street furniture serves in urban settings.

Ultimately, street furniture can either enhance or detract from the quality of an urban environment, depending on its design and placement. Inadequately constructed or incorrectly situated street furniture can hinder social sustainability, whereas well-designed items can enhance the vibrancy and inclusivity of public places.

2.7.3 Roles and Significance of Street Furniture

Street furniture plays a multifaceted role in shaping urban public spaces, offering both functionality and aesthetic appeal, while also encouraging social interaction. According to Mauk Sewandono (2022), street furniture improves the functionality and aesthetics of public spaces, promoting community activities and social engagement. Nonetheless, how effectively these elements boost social dynamics depends on the specific context and design. Lynch (1960) posited that the strategic placement of street furniture can serve as landmarks or focal points, contributing to a sense of place and identity. However, there is a risk that

overemphasising uniformity may lead to a homogenised urban landscape, potentially diminishing local uniqueness.

From a safety and functionality perspective, street furniture can define pedestrian areas and create physical barriers, as emphasised by Gehl (2006), Allameh and Heidari (2020). While illuminated furniture may enhance safety by improving nighttime visibility and reducing crime (Design Council UK, 2011), the effectiveness of these interventions depends on their integration with broader urban planning strategies. Economically, street furniture can stimulate urban vitality by attracting foot traffic and encouraging local spending, as indicated by Diamnti (2014), Grabiec et al. (2022a), and S. Lee (2019). The premise that well-designed furnishings boost economic activity assumes a direct correlation between aesthetics and economic benefits, which may not universally apply. The impact on local economies depends on many factors, including location, design, and cultural context (Diamnti, 2014; Radwan et al., 2016).

Meanwhile, ergonomically designed seating enhances public health by promoting both physical and mental well-being (Gehl, 2010; Mauk & Sewandono, 2022). However, the assumption that such designs universally encourage outdoor engagement and reduce stress must be critically assessed against diverse user needs and preferences (Harsritanto, 2018). Cavalcante et al. (2014) note that street furniture also holds cultural significance. Iconic elements, such as London's red telephone booths or Seoul's illuminated seats, can enhance a city's identity and appeal.

Nevertheless, as Amir et al. (2020) suggest, relying on such symbols for tourism marketing may overlook the broader cultural narratives that contribute to a city's allure. While consistency in design promotes a unified visual identity (Radwan et al., 2016), it may unintentionally suppress local distinctiveness and creativity. While uniform design can enhance accessibility and attractiveness, striking a balance with the preservation of unique cultural expressions is essential.

In conclusion, while street furniture holds significant potential to enhance urban spaces, its design and placement must be carefully planned to realise its benefits fully. The following section will delve into the critical criteria involved in planning street furniture development.

2.7.4 The Planning Process of Street Furniture

The planning process for street furniture within urban public spaces requires a comprehensive approach that balances functionality, visual appeal, and the broad goal of social sustainability. According to Gehl (2010), street furniture enhances the sense of place, promotes social interaction, and elevates the overall urban experience. This planning process begins with an assessment of community needs and an analysis of how different street furniture elements can effectively meet these objectives. An essential component of this approach is ensuring that street furniture is inclusive and accessible to all community members (Allameh & Heidari, 2020). This involves evaluating accessibility for individuals with disabilities, incorporating shaded areas, and designing seating arrangements that facilitate social engagement (Ben Dhaou, Vasváry-Nádor, Gall et al., 2022; Gupta & Bhatti, 2015; Mauk Sewandono, 2022; Siu & Hong Wan, 2011). Material selection is also pivotal; opting for durable, environmentally sustainable materials such as recycled plastics and composite substances can significantly contribute to sustainability goals and reduce maintenance costs (Assunção & Camara, 2000; S. Lee, 2019). Furthermore, street furniture must be strategically positioned to optimise pedestrian traffic flow, ensure safety, and foster environmental interaction (Karndacharuk et al., 2013; Mehta, 2008; Scinta, 2017). Modular seating facilitates adaptability in arranging seats to accommodate various group sizes, while circular benches encourage social interaction by enabling face-to-face engagement (Asep Ahadiat Gandawijaya et al., 2021a; Scinta, 2017).

Therefore, the present study concurs with Dhaou (2023) and Vassary (2022) that post-occupancy evaluation should constitute an integral component of the final planning stages. This evaluation assesses the extent to which street furniture promotes social interaction and enhances urban life (Salim Ferwati et al., 2021). It is crucial for understanding how furniture interacts with the site's layout, surface materials, and spatial organisation. Parameters such as pedestrian flow, visibility, and accessibility are examined to determine whether the configuration fulfils its intended functions (Firdevs, 2013; Mehta, 2007).

Consequently, this research posits that street furniture plays a vital role in urban public spaces, offering a range of benefits. It enhances the attractiveness and functionality of the areas, improves safety, and serves as a distinctive element that contributes to a cohesive city

identity. Street furniture plays a crucial role in shaping the urban experience by fostering a sense of place, creating focal points, and ensuring public safety. By elucidating how street furniture, particularly street seating, contributes to a unified urban identity and functions as a visual and social focal point, this study provides insights for designing more engaging and sustainable street furniture. Special emphasis is placed on optimising street seating design to achieve these objectives.

2.7.5 Street Furniture Design and Types

Street furniture plays a crucial role in shaping the functionality and aesthetics of urban environments. It includes many elements, such as waste receptacles, signage, lighting, bollards, fountains, public art, bus shelters, public toilets, and phone booths. Each type serves specific purposes, enhancing the urban experience by improving cleanliness, safety, navigation, social interaction, and overall well-being. This section will briefly explain the common designs and types of street furniture, highlighting their significance and the challenges they face in modern urban settings. The last one will be the street seating or benches, which is the most vital subject for this study.

- **Waste Receptacles**

They are crucial for upholding hygiene standards and fostering ecological sustainability in urban areas. They assist in reducing littering and promoting responsible trash management (Radwan et al., 2016). Challenges include achieving a balance between utility and minimising environmental effects and selecting sustainable and durable materials that are resistant to vandalism, fire, rust, and stains (Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Yücel, 2013).

- **Signage**

Signage is crucial in guiding, informing, and improving the urban experience for inhabitants and tourists. Signage that is well-designed and strategically placed enhances people's ability to navigate and adds to the overall visual and cultural character of the city (Radwan et al., 2016; Yücel, 2013). The challenges for signage include guaranteeing that the project is easily seen and understood, following the regulations and guidelines of the local area, using environmentally friendly

materials, reducing waste, and including energy-efficient technology. (Radwan et al., 2016; Yücel, 2013).

- **Light fixtures and Posts**

Lighting plays a crucial role in providing sufficient illumination, which enhances social interactions, navigation, and safety (Dastgheib, 2018). Challenges include guaranteeing energy efficiency, utilising recyclable materials, reducing light pollution, and addressing the significant upfront cost of LEDs (Schulte-Römer et al., 2019).

- **Bollards**

Bollards significantly improve safety and navigation. They typically feature lighting capabilities and are used to enhance the performance of CCTV cameras (Brown, 2018). Bollards need to strike a balance between the capacity to recycle and the durability of the product, while avoiding limitations on mobility, and effectively controlling energy consumption and maintenance expenses (Wirdelöv, 2020).

- **Fountains**

Fountains have both utilitarian and aesthetic significance, serving the dual purpose of supplying clean and accessible water while also enriching urban art (Geest & Cocke, 2023; Ivanov, 2009). This product must ensure the use of sustainable materials and effective water management, address the lack of investment in infrastructure, and maintain cleanliness and attractiveness (Bulut & Atabeyoğlu, 2007; Ivanov, 2009).

- **Public art**

Public art has a significant role in fostering dialogue, introspection, and a sense of community, enhancing metropolitan areas with cultural worth (Mohd Fabian et al., 2012; Zebracki, 2013). The challenges include selecting ecologically benign materials, managing the financial burden of high maintenance expenses, and striking a balance between creative expression and the need for public safety and accessibility (Mohd Fabian et al., 2012; Zebracki, 2013).

- **Shelter**

A shelter at a bus stop has many purposes. It protects passengers from various weather conditions, fosters social interaction among them, and provides useful information, thereby enhancing the overall experience of urban transportation (Ely et al., 2012; Whyte, 1988). The challenges include prioritising structural integrity, minimising maintenance requirements, ensuring resistance to vandalism, and effectively combining creative expression with safety and accessibility (Radwan et al., 2016).

- **Bus-stop**

It protects passengers from weather conditions, encourages social interaction, and provides information, enhancing the urban transportation experience (Ely et al., 2012; Whyte, 1988). Ensure structural integrity, low maintenance, and vandal resistance, and integrate artistic expression with safety and accessibility (Radwan et al., 2016).

- **Toilet**

Addresses the requirements for cleanliness and hygiene, improving the quality of urban life by offering easily accessible and properly maintained facilities (Afacan & Gurel, 2015; Moreira et al., 2021). Its challenges include choosing long-lasting, environmentally friendly materials, technologies that conserve water and energy, and guaranteeing accessibility and cultural suitability (Afacan & Gurel, 2015).

- **Phone booths**

Phone booths have historical significance as they have provided privacy and convenience for public communication and served as urban emblems (Banach-Ziaja, 2008; Kowalewski, 2022). The challenges are to ensure booths' durability and environmental friendliness, incorporate advanced technology, and deal with decreased functionality and the risk of vandalism (Franinovic, n.d.; Kowalewski, 2022).

- **Post Box**

Post-boxes facilitate public postal services, allowing residents and businesses to send mail conveniently. They serve as iconic symbols of urban infrastructure and contribute to a city's historical and cultural identity (Banach-Ziaja, 2008). Maintaining structural integrity and aesthetic appeal, addressing vandalism and weather conditions, and modernising to meet contemporary postal demands while preserving traditional values (Banach-Ziaja, 2008).

- **Street Seating / Benches**

Street seating encompasses various options, including benches, seats, modular configurations, and circular or clustered arrangements, all designed to promote social interaction (Ben Dhaou, 2023; Radwan et al., 2016; Yücel, 2013). The materials employed for street seating demonstrate considerable variety, including traditional wood, which offers an organic aesthetic yet requires frequent maintenance, alongside modern metal alternatives like steel and aluminium, valued for their durability (Grabiec et al., 2022a; İhtiyar et al., 2021). Goodwine (2019) claims that recycled plastic has gained popularity due to their environmental advantages and reduced maintenance requirements. Meanwhile, concrete remains esteemed for its durability and seamless integration into urban settings (Babafemi et al., 2018; Siddique et al., 2008). Next are the composite materials that integrate with several components, helping to enhance both durability and aesthetic appeal (Lesovik et al., 2014).

Street seating includes several technical elements, design features, and material selection. For instance, circular benches, designed for social interactions, often accommodate 6-8 individuals, whereas linear benches are generally created for 2-4 persons (Firdevs, 2013; Luximon et al., 2015). Modular seating provides versatility through changes for different group sizes and facilitates maintenance but is limited to specific designs that lack mobility (Firdevs, 2013; Luximon et al., 2015).

Furthermore, beyond the mechanical considerations, the positioning of street seating with other urban components is essential. Literature indicates that seats are often clustered together to facilitate social interaction (Asep Ahadiat Gandawijaya et al.,

2021b; Firdevs, 2013). Thamrin, Mulyono and Antoni (2018) also discovered that metal benches are frequently favoured for their durability and low maintenance requirements. In addition, the study revealed that recycled plastic seats are preferred for their beneficial effects on the environment. Circular benches are frequently utilised in common spaces to encourage social interaction.

Eventually, street furniture is vital in urban planning since it enhances the functionality and aesthetics of public spaces (Siu, 2005; Uzgör et al., 2021; Yücel, 2013). Alongside seating, several elements, including waste receptacles, signage, lighting, bollards, fountains, public art, bus shelters, public restrooms, phone booths, and post boxes, contribute uniquely to the enhancement of the urban environment (Firdevs, 2013; Radwan et al., 2016). Nonetheless, the studies also assert that street sitting is significant because of its ability to facilitate dynamic social encounters, which is reflected in the current study goals. The literature deliberate design and strategic placement of seating and other street furniture components can significantly enhance social interaction, community engagement, and overall sustainability. Moreover, as Abed (2017) and Harsritanto (2018) concur, urban planners can create dynamic and inclusive public spaces that address the diverse needs of all users by prioritising safety, accessibility, and sustainable materials. The ensuing section contains an additional discussion of the street sitting.

2.8 Street Seating

2.8.1 The Significance of Street Seating

Since this study primarily focuses on street seating design, it is essential to understand its significance through three critical aspects: enhancing active social behaviours, improving health and well-being, and contributing to economic benefits. Street seating design fosters social interactions by providing spaces that encourage community engagement and social cohesion. Additionally, well-designed seating contributes to public health by promoting physical activity and offering comfortable spaces for rest and relaxation. Economically, street seating can attract foot traffic, boost local businesses, and enhance the overall appeal

of urban areas. Exploring these elements provides a comprehensive understanding of how effective street seating design can positively impact urban environments and contribute to a more vibrant and sustainable cityscape.

2.8.2 Street Seating Design in Urban Public Space

Street seating, encompassing various seating options beyond traditional benches, is integral to urban public spaces, especially in bustling commercial districts like shopping malls. Designed to provide rest, street seating actively enhances the vitality and functionality of these environments (Luximon et al., 2015). This doctoral research delves into the multifaceted role of street seating, examining its impact on social dynamics, aesthetic enhancement, and the broader socio-economic landscape of urban areas (Oram et al., 2018a)

While all benches and seating provide similar services, there is no standardised terminology to differentiate the design of street seating in urban areas. General-use benches are more adaptable and can fit diverse environments. In contrast, street seating designs tailored to urban public spaces' specific needs offer distinct benefits. Yücel (2013) emphasises the importance of including benches and other seating in urban areas where people gather, socialise, or wait. In public squares, seats should blend well with the environment to avoid looking empty when not in use. The availability and design of street seating significantly impact how people utilise and experience public spaces, providing more than just a place to rest (Peyman & Gökçen Firdevs, 2014).

The placement of street seating in urban public spaces serves a purpose beyond providing a place to rest. Such seating designs create social nodes or hubs, fostering spontaneous interactions and enhancing the overall atmosphere of the space (Asep Ahadiat Gandawijaya et al., 2021c). This intentional design approach is crucial for street seating to fulfil its various functions in public spaces effectively. Research has shown that well-designed seating arrangements can encourage social interaction, thereby improving the social fabric of urban areas (Allameh & Heidari, 2020).

Furthermore, the impact of street seating on social dynamics is profound. Luximon, Kwong and Tai (2015) found that park users in Hong Kong prioritise seating designs that promote social contact, such as circular or clustered layouts, over conventional linear benches.

Similarly, studies on public retail settings have shown that well-planned outdoor seating areas may promote activities that attract people to remain longer and enhance social interaction among users (Oram et al., 2018a). These findings highlight the necessity for thoughtful design and strategic placement of street seating to ensure it contributes positively to public spaces.

The next part of this doctoral thesis will review scholarly literature to explore how street seating design in urban public spaces can enhance social sustainability. This review aims to demonstrate how practical design can encourage social sustainability through improved social interaction, user experiences, and the socio-economic vitality of urban areas. The following sections will provide a detailed look at street seating design's roles, significance, benefits, and technical details, offering insights into its positive impact on urban spaces. Additionally, the study examines current urban design guidelines and best practices to understand how they inform design principles that create vibrant, community-focused environments.

In summary, street seating is a crucial component of urban planning, contributing substantially to public areas' social and experiential aspects. By choosing materials and arrangements to create pleasant and sustainable seating areas, urban planners can increase community engagement, physical exercise, and general well-being (Firdevs, 2013; Luximon et al., 2015; Oram et al., 2018a).

2.8.3 Street Seating Enhancing Active Social Behaviour

This study revealed that seating availability contributes to the success of social spaces and recovery (Mumcu & Yılmaz, 2016). The study added that street seating is vital in establishing urban environments and significantly influences social interaction and recovery. According to Alpak et al. (2020), various elements of street sitting relate to different aspects of social conduct. Mauk Sewandono (2022) argues that street seating enhances public spaces' visual appeal and functionality. Additionally, it fosters social contact, community involvement, and a sense of belonging and uniqueness. Caroline et al. (2019) and Scinta (2017) assert that street seating is crucial in establishing versatile design and areas for leisure activities, social interaction, and community involvement. Moreover,

a multitude of scholars (Allameh & Heidari, 2020; Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022; Mauk Sewandono, 2022; Oram et al., 2018a) agree that street sitting is essential for promoting social contact.

The study by Siu and Hong Wan (2011) emphasises the critical role that street seating plays in determining the overall quality of urban environments and portraying the image of a city. Additional scholars, such as Grabiec et al. (2022a) and (Oram et al., 2018a) emphasise the impact of this mindset on fostering proactive social conduct and enhancing urban outlook. Integrating street seats into public spaces may greatly enhance social conduct by providing a diverse array of opportunities for interaction. Gehl's (2010) study illustrates that deliberately placing and arranging street seats may improve accessibility and functionality, resulting in more inviting and valuable public spaces. Street seating is critical in encouraging social interactions and fostering a sense of community belonging (Altman et al., 2012; Ismail & Said, 2015; J. H. Lee & Lee, 2013)

Furthermore, Gehl (1989) and Cavalcante et al. (2014) suggest the use of street seating to establish unique identities for public spaces, thus enhancing the local ambience and cultivating a distinct sense of place. Carmona (Carmona, 2019a) emphasises the importance of physical attributes in creating inequalities in public areas, which aligns with this observation. Raipat (2016) argues that being mindful of intricate aspects of street seating and notable architectural landmarks significantly improves the overall quality of urban settings and promotes stronger bonds among community residents and visitors.

In essence, street sitting is crucial for promoting social interaction. Nevertheless, it is essential to acknowledge that various types of street furniture, like bollards, signage, and planters, can substantially impact urban social behaviour. Urban planners may create environments that promote different social interactions and foster a stronger sense of community by intentionally integrating these elements.

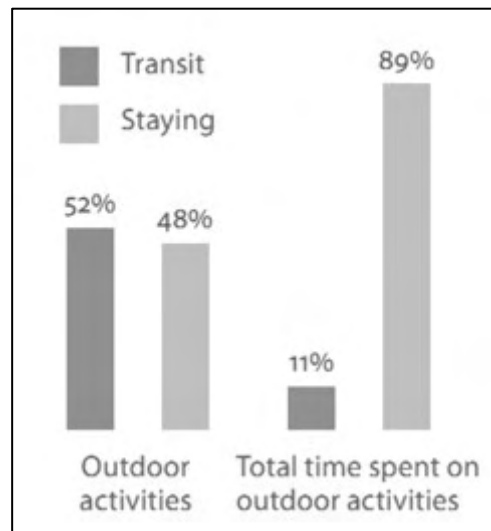


Figure 2-4: The frequency of transit vs staying activities and their total time in public open spaces, (Gelb 2010).

2.8.4 Health and Well-being

Street sitting significantly influences a person's general health and well-being. Street seating is designed with ergonomic features, such as benches with curved forms, which improve physical comfort and promote extended outdoor stays, resulting in several health benefits for the body and mind (Zhang et al., 2022). A study published in the American Journal of Public Health shows that easily accessible and enjoyable public seating encourages physical activity and reduces stress, improving health outcomes (Anderson et al., 2017). Mauk Sewandono, (2022) argues that inclusive street seating designs enhance accessibility for many demographic groups, including the elderly and disabled, promoting social inclusion and well-being (Zhang et al., 2022).

The design and location of street seating considerably impact public health when studied systematically (Anderson et al., 2017). Urban planners may enhance mental and physical well-being by providing convenient and inviting seating alternatives in strategic locations to encourage outdoor activities and social connections. The inclusive design seeks to ensure that public spaces are accessible to people from all demographic categories, therefore promoting social equity and improving general well-being. According to Ben Dhaou et al. (2022), strategically locating street seats in welcoming and pleasant environments can

enhance community involvement, recreational opportunities, and positive social relationships. Aziz (2013) highlights the beneficial influence of street sitting on community life by facilitating social interaction and cultivating a cohesive identity. Consequently, this adds to the overall well-being of urban communities.

2.8.5 Street Seating for Economy Impacts

Street seating provides substantial and varied economic benefits. In summary, seating in public spaces can significantly boost economic activity by increasing foot traffic, enhancing property values, and boosting tourism (Peyman & Gökçen). Thoughtfully placed seating can also contribute to crime reduction, cost savings, and environmental sustainability by encouraging pedestrian-friendly environments. Moreover, it can improve public health by providing rest and social interaction spaces. These benefits highlight the importance of strategic planning and thoughtful design in providing public seating to maximize its positive impact on urban environments (Firdevs, 2014; Yücel, 2013).

Historical documentation suggests that cast iron street seats were used in the UK throughout the Industrial Revolution. These seats served practical purposes while enhancing the city's cultural and historical appeal, boosting tourism (Soffritti et al., 2020). Objects such as cast-iron chairs, light posts, and railings serve practical purposes while evoking a sense of historical and cultural heritage. They enhance urban settings' unique essence and allure (J. H. Lee & Lee, 2013).

Investments in street seating can enhance economic growth by enhancing the attractiveness of public spaces. Strategically designed and well-placed urban infrastructure may improve the movement of pedestrians, attract visitors, and support the development of local businesses. This boosts the local economy and enhances urban areas' overall vibrancy and appeal (Radwan et al., 2016). With their historical importance, these aesthetically pleasing monuments enrich the whole experience of tourists. These features operate as significant draws for city tours and historical trails, offering tourists a glimpse into the industrial past of the UK. Tourists are drawn to the aesthetic and emotional qualities of cast-iron street seating, which improves the look of public spaces and inspires nostalgia, deepening their emotional connection to the place (Amir et al., 2020; Miller et al., 2010).

Cabanek et al. (2020) highlight the importance of street seating in social and economic situations, referencing the studies of Jane Jacobs (1961) and organisations such as "Project for Public Spaces," as well as the intricate designs by Jan Gehl. They argue that public spaces and streets are not only seen as places for mobility but as critical elements of urban life, playing a pivotal role in cities' economic prosperity and cultural variety. Street seating is a vital economic asset due to its ability to stimulate tourism and improve a city's reputation, which is essential for financial and aesthetic reasons (Ben Dhaou, 2023; Mehta, 2013, 2014; Yücel, 2013).

2.8.6 Street Furniture Challenges

Subsequently, over the years, extensive research has been conducted on various aspects of street furniture design (see, e.g., Ben Dhaou et al., 2022; Ben Dhaou & Vasvary-Nador, 2022; Prvanov, 2017; Siu, 2005; Zvonareva et al., 2020). These studies address a broad range of issues, including design quality, placement and installation, ergonomics, durability, sustainability, maintenance, material choice, vandalism, and the role of street seating in fostering social interactions within public spaces.

As previously discussed, street furniture design, particularly street seating, plays a crucial role in shaping urban public spaces by providing essential amenities and enhancing overall environmental quality. It is vital to address the challenges associated with street furniture to develop more effective solutions. This PhD research examines the difficulties in the thoughtful creation of urban public spaces, with a focus on street seating design for promoting social interaction. The research explores issues related to accessibility, aesthetic coherence, and functionality, aiming to ensure that urban spaces are inclusive and effectively utilized. By addressing these challenges, the research seeks to advance the design of urban environments and promote a comprehensive approach to encouraging active social behaviour through street seating design. Therefore, the following section highlights these challenges in detail.

One of the main difficulties with street furniture is its **design**. Siu (2005) states that the evaluation of street furniture tends to prioritise the practical functionality of the design, primarily because designers often emphasise the physical comfort and usability of the

product. In line with Prvanov (2017), research on street furniture design usually focuses on one specific aspect, such as identity or aesthetics, while neglecting the connections between other variables. Designers must also consider psychological, cultural, social, and ideological factors in addition to physical comfort and usability. Prvanov and Siu argue that focusing solely on physical aspects is insufficient and does not provide comprehensive design principles (2017; 2005).

Second, according to Ben Dhaou et al. (2022), the **placement and installation** of street furniture in urban public spaces also present challenges. As Yücel (2013) claimed, it is sometimes challenging to thoroughly comprehend how site design incorporates the furniture items utilised for various defined tasks and creates a feeling of place. Sofiana (2018) added that the contradiction between the placement and street furniture facilities poses a challenge to their effective integration. For instance, an analysis by Zvonareva et al. (2020) in Krasnoyarsk highlighted irrational space organisation: the layout and arrangement of benches were poorly planned, resulting in inefficient use of space and a lack of consideration for visitor flow, privacy needs, and protection from the elements.

Moreover, Prvanov (2017) emphasised that design spaces often fail to adequately account for the multifunctional use of public areas, leading to conflicts between pedestrian pathways, seating areas, and other amenities. Although these examples are specific to Krasnoyarsk, similar issues with street seating design are prevalent, as highlighted in numerous studies mentioned above.

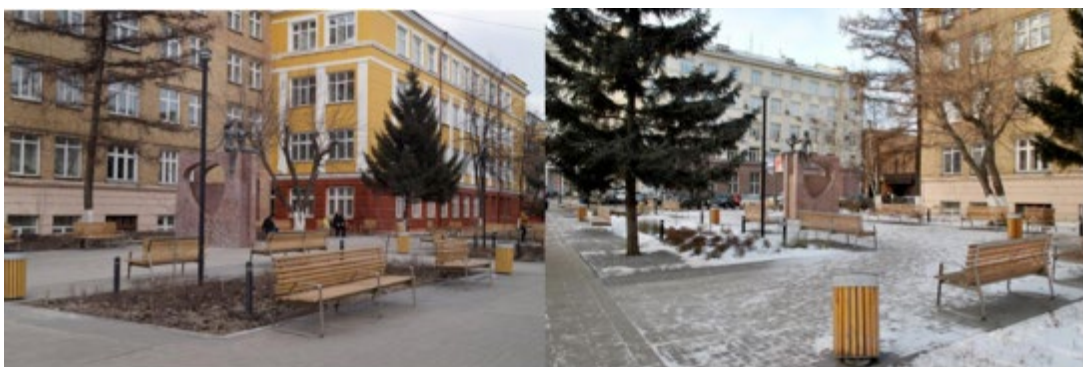


Figure 2-5: Shows an abundance of benches in small places; therefore, just half of them are used



Figure 2-6: Figures compel individuals to sit directly opposite each other. Such configurations often contradict ergonomic principles and disrupt a comfortable psychological atmosphere due to the enforced direct eye contact.

The findings also suggest that the current approach to street furniture design in Krasnoyarsk falls short of meeting the needs and preferences of the urban population. The study advocates for a new approach that considers ergonomics, durability, aesthetics, environmental sustainability, and practical functionality.

Along with these points, scholars have also commented on the challenges pertaining to the **sustainability and maintenance** of street furniture (Tazilan et al., 2008; Allameh et al., 2018). Allameh and Heidari (2020) argue that street furniture, while prevalent, is often designed with a primary focus on practical functionality, thereby overlooking its potential to significantly enhance urban life. Similarly, Ben Dhaou and Vasvary-Nador (2022) contend that the environment is increasingly at risk due to a lack of sustainable practices and individual concerns. This issue is reflected in the substandard design and maintenance of street furniture. Rehan (2013) highlights the significant difficulties that arise in sustainable urban planning due to the neglect of street furniture in many cities, which are either outdated or poorly maintained. He also added that this not only detracts from the visual appeal of public spaces but also fails to meet **sustainability** criteria. Frequently built from non-sustainable materials requiring frequent maintenance and servicing, this furniture results in higher costs and increased environmental impacts. Furthermore, inadequate maintenance can create safety hazards and degrade the overall quality of the urban streetscape.

Building on this, Arisoy (2020) asserts that the upkeep of street furniture faces significant challenges due to **vandalism** and public behaviour. Conversely, Arefpour et al. (2022) argue that poorly maintained or unsecured urban spaces are more susceptible to vandalism, influenced by environmental factors. Vandalism is a significant issue in urban environments and often manifests as violence and rebellion, with intentional and malicious actions undertaken to damage various city components. According to Yücel (2013), street furniture is frequently targeted by acts of vandalism, including burning, slashing, carving, and spray painting. Yücel emphasises the importance of considering vandalism resistance in the early planning stages, as certain materials and designs are more resilient to such acts.

Scholars such as Pfattheicher et al., 2019; Gomes et al., 2017; Khalilikhah et al., 2016; Ghanbari et al., 2017; Atilla, 2016; and Yavuz, 2011, who have extensively studied vandalism, commonly observed in urban environments and is acknowledged as a significant issue (Arisoy, 2020). Therefore, as asserted by Arisoy, Yavuz, and Kuloğlu (2020; 2011), it is crucial to prioritise strategies aimed at addressing vandalism and fostering responsible conduct to protect the integrity and longevity of street furniture in urban public spaces.

Yavuz and Kuloğlu (2011) argue that vandalism contributes to the **decline of social interactions** and public spaces, leading to decreased user satisfaction with amenities. Similarly, Arisoy (2020) found that vandalism can occur even in the absence of social relationships and physical structures, attributing it to social and physical factors. He cited studies by [Dinctürk (2007), Tarakc (2003), Akyol (2006), Feyzi et al. (2008), Shachaf and Hara (2010), and Goldstein (2013)] to support this claim.

Arisoy (2020) highlighted that vandalism is influenced by the physical environment and structures within urban spaces, specifically the design and placement of street furniture such as benches, lighting, trash cans, and picnic tables. Factors such as size, shape, type, and social control or surveillance can influence the likelihood and nature of vandalism acts. The study suggests that vandalism results from a lack of awareness, inadequate sanctions, and poor-quality materials, all of which impact the quality of life in urban areas. The figures below provide additional evidence supporting the issue of street furniture and its relation to acts of vandalism.



Figure 2-7: An example of vandalism on urban street furniture: a public bench defaced with graffiti, highlighting issues of maintenance and social behaviour in city environments. Photo: <https://www.pps.org/article/generalseating>

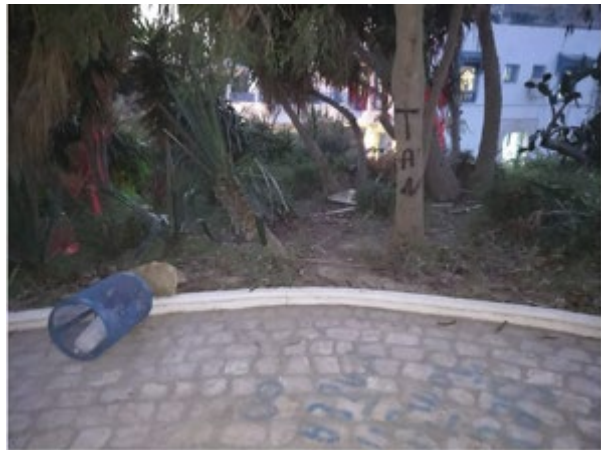


Figure 2-8: Lack of street furniture and poor-quality design in urban spaces can lead to acts of vandalism, as depicted in these images.

Based on these findings, urban streets often lack diverse street furniture designs, resulting in insufficient accessibility to amenities that contribute to social well-being within public spaces. This insufficiency hinders the establishment of a meaningful connection between street furniture and a city's distinctive identity and cultural aspects. Aziz (2013), suggested that street furniture designs are underutilised in terms of their potential social utility, primarily due to the absence of socially comfortable design elements.

2.8.7 Key Considerations for Social Street Furniture Design, including Street Seating

The effectiveness of street seating in fostering active social behaviour depends on its design and location. As indicated by scholarly research, practical street seating should consider the following factors:

i. Comfort and Accessibility:

- According to Mehta, (2008) and Mehta & Bosson, (2021), street seating should prioritise user convenience and accessibility, including for those with disabilities. In addition, (Yücel, 2013) advised placing some seats near public facilities and telephones for disabled individuals. Seats should provide at least 1 m of space for wheelchairs, and tabletop heights should range between 0.75 and 0.90 m, and the minimum height under the table should be 0.6 m.
- Kaya et al. (2022) and Mouthé & de Menezes, (2000) suggests that achieving a positive user experience can be influenced by pragmatic user requirements such as ergonomic designs, sufficient space, and flexible furniture for limited spaces.
- In addition, it is crucial to provide urban furniture with work amenities and intelligent technologies that offer protection against adverse weather conditions such as rain, snow, wind, and sun. These advancements enhance safety and efficiency and provide valuable information (Grabiec et al., 2022b). Technologies such as touch displays, audio, navigation, environmental sensors, charging stations, mobile integration, Wi-Fi, and management software offer contextualised information and interactive services, making users more comfortable spending extended periods in these spaces (Carmona, 2019b).

- Kevin Lynch (1960) emphasises the importance of imageability in urban design, which can indirectly contribute to creating inclusive and inviting public spaces. He categorises urban elements into five types: The author categorises urban elements into five types: People travel through the city on i) paths. They can be roads, pavements, walkways, or other ways. Then it called the city ii) edges to divide the city into pieces. They might be rivers, barriers, or essential roadways. Edges show how the city is planned out and distinguish neighbourhoods—following iii) districts, where city areas have their character or function. People often name communities after their design, land usage, or social activities. The city's districts help people navigate. Then, the city iv) nodal points sites, where many people gather. They are where many routes converge, and people assemble or determine how to travel. Nodes can be buildings, plazas, crossroads, or other navigational aids. Finally, v) landmarks are notable and easy to discover. They guide people around and help them locate their destinations. Famous landmarks are simple to recall, natural, cultural, or built. These findings have been supported by other scholars, including Alpak et al. (2020), Gehl (2010), Mumcu & Yılmaz (2016), and Whyte (1980).

ii. Variety of Seating Options:

- According to Whyte (1980, p. 28), seating arrangements that promote social comfort provide individuals with a range of flexible options, including the ability to sit in various positions such as "sitting up front, in back, to the side, in the sun, in the shade, in groups, off alone".
- İhtiyar et al. (2021) found that versatile sitting alternatives, such as benches, stools, and low walls, suit varying tastes and activities. These alternatives enable people to interact with their environment in different ways, fostering a dynamic social environment. Furniture placement is crucial for a seamless fit with other furniture and the surroundings. Additionally, the study advocated for seating components that encourage relaxation, social connection, and aesthetic delight. It should also accommodate dining, reading, sleeping, needlework, chess, sunbathing, watching, and talking.

iii. **Placemaking and Aesthetics:**

- A study by Oram et al. (2018) found that several key factors can influence the adequacy of seating design, including aspects such as quantity, placement, orientation, and spacing. Furthermore, integrating seating designs with the surrounding environment is crucial for enhancing placemaking or local identity (Hossein Askari & Soltani, 2022; Kaya et al., 2022b; Marshall, 2015). According to Alpak et al. (2020), it is recommended that each design should incorporate the ability for the space to develop an identity, image, or, in other words, a meaningful dimension, by means of the distinctive structure of the design element.
- The strategic integration of landscaping, lighting, and artistic elements can enhance the aesthetic appeal of spaces and create a welcoming ambience. The evaluation of furniture design can be facilitated by considering its form, colour, texture, materials, and functionality (Kaya et al., 2022; Peyman & Gökçen Firdevs, 2014).
- Based on the study conducted by Alpak et al. (2020) and Duzenli et al. (2018), seating furniture, when designed with consideration for various dimensions, plays a significant role in the creation of urban furniture that is innovative, creative, aesthetically pleasing, functional, and practical.

iv. **Shade, Protection and Safety:**

- Trees, umbrellas, and overhead constructions provide shade and protection. These precautions allow people to sit comfortably in any weather. Scholars recommend designing urban furniture to match its physical traits, intended uses, and symbolic significance. A well-designed sitting unit should provide shelter, tree shade, boundaries, bicycle parking lights, adaptability for diverse activities and purposes, and contribute to urban identity, image, and space (Alpak et al., 2020; Kaya et al., 2022).
- According to Whyte's research, individuals are more likely to choose seating in sunny areas when the temperature is comfortable. Sunlight, reflected light, temperature, and weather conditions are crucial in ensuring comfort. Additionally, individuals can choose between sun exposure, shade, or a combination of both (1980).

- As for safety, (İhtiyar1 et al., 2021) contended that it is crucial to securely install seats on the ground and address any instances of vandalism, regardless of the extent of damage. Ensure the safety of the seating component by assessing its construction and night-time illumination.
- The temperature of urban furniture is influenced by factors such as the colour and texture of surrounding surface materials, the selection of appropriate plants and trees for shade in different climates, and the strategic placement of wind control measures. Urban furniture made of materials with low heat retention, light colour, and a flat surface will reflect sunlight during the day.
- The availability of street furniture should be proportional to the level of activity in a particular area. It should be strategically positioned to provide pedestrians with safe, unobstructed pathways without creating hazards (Yücel, 2013).

v. Flexibility and Arrangement:

- Configurable seating accommodates solo or group use, enabling diverse social interactions. According to Hossein Askari and Soltani (2022) and İhtiyar1 et al. (2021), they suggested that in particularly congested locations, rest stops should be every 60 metres. Arrange seats every 100 metres for better urban or private locations. The minimum wheelchair pivot space is 150 cm, and 120 cm of paved space beside the seating area makes it more comfortable for people with disabilities. Additionally, the study noted that creating seating areas that cater to both individuals seeking solitude and social groups is crucial.
- Furthermore, according to Whyte (1980, p. 39), *“one linear foot of sitting space for every thirty square feet of plaza”* should be allocated.
- Lesan and Gjerde (2020) suggest that street benches should be positioned at a safe distance from both vehicular traffic and pedestrian activity to ensure optimal observation of surrounding activities.
- Mehta (2007) found that previous studies and interviews yielded inconclusive results regarding the seating preferences of various ethnic groups in public settings. Lesan and Gjerde (2020) suggested that nearby businesses have indeed changed seating usage behaviours and cycles. Subsequently, both studies concurred that each highly sought-after seat was situated on vibrant streets,

surrounded by active businesses that fostered an active environment for individuals.

vi. Maintenance and Materials:

- According to Radwan et al. (2016b) and Mouthé & de Menezes, (2000), seats need regular maintenance to work and look good, encouraging social activity.
- The study also emphasises that the selection of urban furniture materials requires consideration of many factors. This category encompasses technical factors such as strength, durability, safety, life cycle impact, reusability, spatial considerations, economic factors (including wear and tear), sensory elements (such as comfort, acoustics, lighting, and aesthetics), and psychological factors (including well-being). Exterior strength and durability are key factors in determining furniture quality.
- Meanwhile, in the study by İhtiyaret al. (2021), they also assert that seating elements should be constructed with minimal materials, without decorative components, a lightweight carrier structure, and multiple functions. This feature simplifies furniture disassembly, installation, and maintenance reassembly. They emphasised that design, materials, and location influence the maintenance of urban living components. Sunlight, rain, and snow significantly reduce the durability of seating elements. Maintain and repair the seat to prolong its life. Outdoor chairs needed cleaning due to dirt, leaves, bird droppings, and food and drink spillage. Integrating sustainability aspects is also significant during material selection, as it benefits both the economy and the environment while enabling effective maintenance.

2.9 Contemporary Street Furniture Design Specifications

The study's investigation focuses on contemporary street furniture design criteria and the resulting design. "Contemporary" street furniture design refers to modern, innovative designs that address current urban needs and aesthetic preferences (Carmona, 2010). The subsequent visual representation exemplifies a concept presently implemented in the design of contemporary street seating. In urban environments, most designs emphasise diverse

forms and functions, whereas urban planning traditionally focuses on structures (Prvanov, 2017). However, contemporary approaches acknowledge that benches, lighting, and interactive installations are pivotal in creating dynamic and engaging urban spaces (Chew et al., 2021). Therefore, the current study explores practical street furniture configurations that effectively incorporate aesthetics, environmental awareness, and practicality. This illuminates the changing field of urban design and its influence on community engagement, specifically on implementing street seating that promotes socially active behaviour in a way that effortlessly positively adapts to the urban atmosphere.

2.9.1 The Ergonomics Specifications of the Street Seating Fitting

Assunção and Camara (2000) underscore the necessity of integrating ergonomic principles into urban seating design, highlighting their importance across various design disciplines. Prvanov (2017) reinforces this by noting that ergonomically designed seating solutions enhance user comfort and utility, thereby improving overall user experience and well-being. The simplicity of ergonomic design makes it accessible to professionals from diverse backgrounds, allowing them to enhance the functionality and comfort of street furniture in urban settings. According to Openshaw and Taylor (2006), understanding ergonomics, which includes anthropometry, posture, repetitive motion, and workspace design, is critical for meeting end-user needs, resulting in greater comfort, productivity, and reduced stress. They provide the following description of the significance of ergonomics (p.3):

"Ergonomics can be integral to design, manufacturing, and use. Knowing how the study of anthropometry, posture, repetitive motion, and workspace design affects the user is critical to a better understanding of ergonomics as they relate to end-user needs, and results can be more comfort, higher productivity, and less stress."

They describe ergonomics as integral to design, manufacturing, and usage, stating that understanding anthropometry, posture, repetitive motion, and workspace design is crucial for meeting end-user needs. They also added that this knowledge can lead to increased comfort, productivity, and reduced stress (Openshaw & Taylor, 2006, p. 3). It also illustrates a comparison of percentiles between males and females as shown in Figure 2.9. Below are the differences that designers should consider when designing street seating.

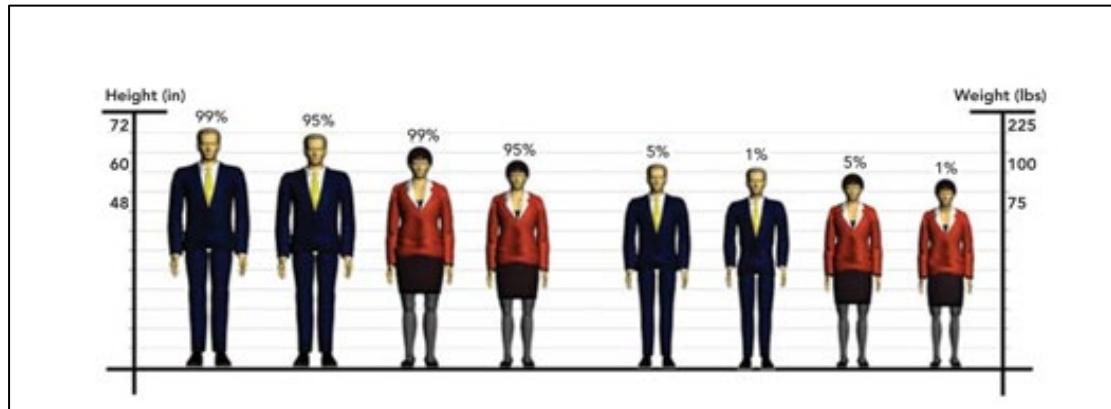


Figure 2-9: Anthropometric variations across populations. Scandinavians are generally taller, while Asian and Italian groups tend to be shorter.

For example, ergonomic street seating should accommodate diverse user needs through features such as adjustable seat heights, adaptable backrest angles, and curved seating surfaces that follow the body's natural contours to promote comfort and proper posture (Siu & Wong, 2015b; Sokhibi et al., 2020). The use of materials that provide both comfort and durability further enhances ergonomic quality, creating supportive seating environments suitable for a wide range of users (Allameh & Heidari, 2020).

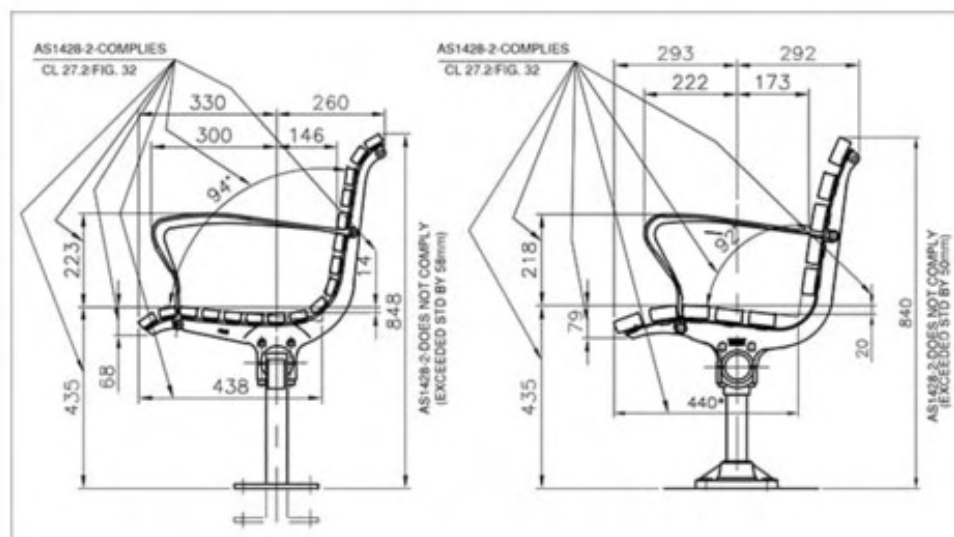


Figure 2-9: Technical Drawing of an Outdoor Bench Design with Dimensions and Compliance Details

The figure above illustrates how Street Furniture Australia (2019) applies the principles of the Australian Disability Discrimination Act 1992 (DDA) within street furniture design to ensure accessibility for individuals with disabilities and to promote wider inclusivity. With the global ageing population projected to triple by 2050, integrating ergonomic considerations has become increasingly critical, enabling older adults to navigate urban environments with greater independence and comfort. Comparable accessibility standards exist internationally, reinforcing the global importance of embedding ergonomic principles into street furniture design.

Ergonomic street seating, however, depends not only on its design but also on its strategic placement and ongoing maintenance. As highlighted by Sokhibi et al. (2020), well-positioned seating can facilitate social interaction, enhance public safety through increased natural surveillance, and stimulate economic activity by encouraging people to remain longer in commercial areas. Yet without regular and proper maintenance, even the most thoughtfully designed seating can deteriorate, becoming uncomfortable, dysfunctional, or visually unappealing—ultimately diminishing its intended benefits (Gouvea & Mont’Alvao, 2013). This underscores the necessity for urban planners and designers to consider the entire lifecycle of street seating, from design and installation to routine maintenance and renewal (Carmona, 2021).

In agreement with (Allahdadi, 2017a), Ben Dhaou (2023) and Erfaninejad & Heidari (2018), the current study affirms that incorporating ergonomic principles together with thoughtful placement and long-term maintenance planning can result in street seating that is not only comfortable and inclusive but also contributes to the broader functionality, character, and aesthetic quality of public spaces. Ultimately, such a holistic approach enhances the vibrancy and liveability of urban environments (Carmona, 2019a). The following section will discuss material specifications appropriate for street seating.

2.9.2 The Material Specifications of the Street Seating Fitting

The material selection for street seating is critical, influenced by factors such as durability, environmental impact, and aesthetic appeal (Aziz, 2013; Ben Dhaou & Vasvary-Nador, 2022; Yücel, 2013). Due to constant exposure to outdoor elements, materials must be durable and weather-resistant (Gupta et al., 2015). Traditional materials like steel and wood are favoured for their robustness and aesthetic qualities. Steel offers strength and weather resistance, while wood provides a natural look but requires frequent maintenance. Concrete and stone are durable for high-traffic areas but offer limited design flexibility. Contemporary materials such as polypropylene and polyethene have significant advantages. They are versatile, allowing innovative designs and providing durability and comfort. These materials are weather-resistant and require minimal maintenance, with some incorporating recycled content, making them a sustainable choice (Gupta & Bhatti, 2015).



Factors influencing material choice include resistance to vandalism, ease of maintenance, anticipated weather conditions, user demographics, cost considerations, and the feasibility of using environmentally friendly materials (Gandawijaya et al., 2021; Gupta & Bhatti, 2015). While concrete is durable, it suffers from poor drainage and comfort issues due to its cold surface and limited back support. Steel offers flexibility, strength, and cost-effectiveness with a high strength-to-weight ratio and recyclability (Yücel, 2013). Wood provides natural warmth and aesthetic appeal but requires significant maintenance and is more vulnerable to environmental damage (Prvanov, 2017).



Critically, the choice of materials must also consider social and psychological impacts. For instance, poorly maintained wooden seating can convey neglect, reducing the perceived safety and attractiveness of an area (Gupta & Bhatti, 2015). Similarly, while recycled plastics offer environmental benefits, they may lack the aesthetic warmth of natural materials, potentially affecting user satisfaction (Asep Ahadiat Gandawijaya et al., 2021).


Bamboo is emerging as an alternative to wood, offering dimensional stability and resistance to weather conditions. It grows faster than hardwood and absorbs more CO₂, making it an environmentally friendly choice (Kawther & Hussien, 2020). However, its novelty may pose challenges in gaining acceptance and proving its long-term durability in urban settings.

Stone is robust and vandal-resistant but has limitations in drainage and aesthetics. Recycled plastic is durable, low-maintenance, and sustainable, surpassing wood in longevity and performance (Gupta & Bhatti, 2015).

In summary, selecting materials for street seating involves balancing durability, maintenance, and aesthetic considerations. The challenge lies in integrating these factors while also addressing social dynamics and environmental sustainability. Consistent maintenance and public education on proper use are essential to ensure the longevity and positive perception of street furniture (Prvanov, 2017; Abdul Rahman et al., 2018). By carefully selecting and maintaining these materials, urban planners can create inviting, durable, and sustainable public seating that enhances the user experience and contributes to the overall functionality and aesthetics of urban spaces. The following table provides examples of common materials used in street seating, along with further details (Yücel, 2013) and images.

MATERIAL	DURABILITY	USE	RELEVANT INFORMATION	EXAMPLE
Steel	High	Benches, bollards, waste receptacles	Versatile, high strength-to-weight ratio, durable, resistant to corrosion and impact, requires no maintenance, cheap in terms of life-cycle cost, fully recyclable.	 <p>Source: https://images.esi.info/Images/6573_1653400212246_PF.jpg?tr=w-700,h-579,cm-extract,x-0,y-0:w-665,pr-true</p>
	- High durability, resistant to corrosion, impact, and vandalism. Requires no maintenance and is fully recyclable.	- Commonly used for benches, bollards, and waste receptacles due to its versatility and strength.	- The most resistant material to vandalism, but it can be costly. It is versatile and can be shaped to fit any design aesthetic.	
Wood	Moderate	Benches, tables	Natural material, feels warmer in cold weather and cooler in hot weather, dries slowly, requires more maintenance, prone to vandalism (e.g., burning, carving).	 <p>Source: https://streetfurniture.com/wp-content/uploads/2021/01/Linea-Seat-Bench-and-Macchiato-Dinning-Table-700x500.jpg</p>
	- Moderate durability, requires regular maintenance, and is prone to vandalism.	- Often used for benches and tables, appreciated for its natural feel and aesthetic appeal.	- Requires treatment and maintenance to maintain its durability. Different types of wood have varying levels of resistance to weather and vandalism.	
Concrete	Very High	Benches, tables, bollards	Heavy, does not need to be mounted, difficult to vandalize, long durability, may lack innovation in	

			design, does not drain or ventilate well after rain.	 <p>Source: https://i.pinimg.com/736x/20/1a/26/201a2644f64e340e7df3c73502b5c39a.jpg</p>
	<i>- Very high durability, heavy, and difficult to vandalize. May lack innovation in design and does not drain or ventilate well.</i>	<i>- Used for benches, tables, and bollards, especially in areas where durability and resistance to vandalism are crucial.</i>	<i>- Heavy and durable, but it may appear outmoded and lacks innovation in design. It is difficult to vandalize and does not require mounting.</i>	
Stone	Very High	Benches, tables, bollards	Durable, does not need to be mounted, resistant to vandalism, limited in aesthetic possibilities, does not ventilate or dry well after rain.	 <p>Source: https://down-my.img.susercontent.com/file/my-11134201-7r98u-lqc68ytupwid1f</p>
	<i>- Very high durability, heavy, and resistant to vandalism. Limited in aesthetic possibilities and does not ventilate or dry well.</i>	<i>- Used for benches, tables, and bollards, valued for its durability and resistance to vandalism.</i>	<i>- Very durable and resistant to vandalism, but it has limited aesthetic possibilities and does not drain or ventilate well.</i>	
Recycle Plastic	High	Benches, waste receptacles	Durable, low-maintenance, cost-effective in the long term, may be UV-stable.	

	<p>- High durability, low-maintenance, and cost-effective. May be UV-stable, making it suitable for outdoor use.</p>	<p>- Used for benches and waste receptacles, appreciated for its durability, low-maintenance, and eco-friendliness.</p>	<p>- Highly durable, low-maintenance, and eco-friendly. It can be UV-stable, making it suitable for outdoor use.</p>	 <p>Source: https://uk.glasdon.com/images/products/400/Phoenix-014.jpg</p>
Metal	High	Benches, tables, waste receptacles	Durable, requires moderate maintenance, can be prone to rust without proper treatment.	 <p>Source: https://www.euroform-w.com/assets/galleries/365/res-Tulip_64M_Comune_di_Bolzano_Parco_Stazione_2010_1.JPG</p>
	<p>- High durability, resistant to rust and corrosion if properly treated. Requires moderate maintenance. Versatile in design and can be combined with other materials for added strength and aesthetics.</p>	<p>- Used for benches, tables, and waste receptacles due to its versatility and strength. Often combined with other materials to enhance aesthetic appeal and functionality.</p>	<p>- Metal furniture is durable, impact-resistant, and versatile in design, making it ideal for public spaces. Treatments like powder-coating or galvanization are needed to prevent rust. However, metal may become uncomfortable due to extreme temperatures. It is often combined with other materials for improved design and functionality.</p>	
Cement	Very High	Benches, tables, bollards	Durable, can be moulded into various shapes, relatively low cost.	


	<p>- Very high durability, heavy, and difficult to vandalize. Requires maintenance to prevent cracking and to ensure longevity. Can withstand various weather conditions but may require sealing to prevent water absorption.</p>	<p>- Used for benches, tables, and bollards, especially in areas where high durability and resistance to vandalism are crucial. Suitable for both indoor and outdoor settings.</p>	<p>- Cement is heavy and durable, making it stable and resistant to vandalism. It can be moulded into various shapes and designs, but it may lack innovative aesthetic possibilities. Requires proper sealing and maintenance to prevent cracking and water absorption. Suitable for environments requiring robust and long-lasting furniture.</p>	 <p>Source: https://www.astrastreetfurniture.com.au/images/detailed/10/concrete_log.jpg </p>
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Table 2-2: Table Material - Design Principles and Elements for High-Quality Public Spaces

Source: (Yücel, 2013).

2.9.3 The Key Stakeholders in Shaping Street Seating Design in Urban Public Space

Street seating design in urban public spaces requires a multidisciplinary approach involving various professionals. Each professional brings unique skills and expertise to ensure that street seating is functional, aesthetically pleasing, and beneficial to the community. The following table outlines the key professionals involved, their main job specifications, and the optimal timing for their inclusion in the project.

Professional	Main Job Specifications	Optimal Timing for Inclusion
Urban Planners	Assess community needs; Develop comprehensive plans for urban spaces; Coordinate with other professionals (Carmona, 2014)	Early stage: Project inception and planning
Architects	Design the overall structure and layout; Ensure aesthetic appeal and functionality (Science, 2006)	Design stage: Concept development and preliminary design
Landscape Architects	Integrate seating with the natural environment; Design green spaces and walkways (Phillips, 2004)	Design stage: Site analysis and detailed landscape design
Industrial Designers	Design ergonomic and user-friendly seating solutions; Select appropriate materials (Openshaw & Taylor, 2006)	Design stage: Detailed product design and prototyping
Civil Engineers	Ensure structural integrity; Oversee the installation process (Wannarka & Ruhl, 2008)	Implementation stage: Construction and installation
Community Engagement Specialists	Facilitate community input and feedback; Ensure designs meet community needs (Bambó Naya et al., 2023)	Early and ongoing: Throughout planning, design, and evaluation
Environmental Engineers	Assess environmental impact; Implement sustainable practices (Morelli, 2011)	Early stage: Environmental assessment and sustainability planning

Professional	Main Job Specifications	Optimal Timing for Inclusion
Accessibility Consultants	Ensure compliance with accessibility standards; Advocate for inclusive design (David & Richards, 2017)	Design stage: Accessibility assessment and recommendations
Project Managers	Oversee project timelines and budgets; Coordinate between all stakeholders (Carmona et al., 2002)	Throughout: From project inception to completion
Maintenance Teams	Plan for ongoing maintenance; Ensure durability and longevity (Diamnti, 2014)	Late stage: Post-installation and ongoing maintenance

Table 2-3: Roles and Optimal Timing for Inclusion of Key Professionals in Urban Street Seating Design Projects – Author, 2025

2.9.4 Detailed Professional Involvement

1. **Urban Planners:** Urban planners are responsible for assessing the community's needs and developing comprehensive plans that outline the integration of street seating within urban spaces. Their involvement is crucial from the project's inception, as they set the framework and coordinate with other professionals to ensure cohesive development
2. **Architects:** Architects design the overall structure and layout of street seating, ensuring that it is both functional and aesthetically appealing. Their role is pivotal during the concept development and preliminary design stages.
3. **Landscape Architects:** These professionals integrate street seating with the natural environment, designing green spaces and walkways that enhance the user experience. Their expertise is essential during site analysis and detailed landscape design (Swaffield, 2002).
4. **Industrial Designers:** Industrial designers focus on creating ergonomic and user-friendly seating solutions, selecting materials that balance durability, comfort, and sustainability. Their involvement is key during the detailed product design and prototyping stages (Norman, 2002).

5. **Civil Engineers:** Civil engineers ensure the structural integrity of street seating and oversee the installation process. They play a critical role during the construction and installation phases to ensure safety and durability (Ashford, 2013).
6. **Community Engagement Specialists:** These specialists facilitate community input and feedback, ensuring that the designs meet the needs and preferences of the local population. Their involvement is necessary throughout the planning, design, and evaluation stages to maintain community support and relevance (Friedmann, 2011).
7. **Environmental Engineers:** Environmental engineers assess the environmental impact of street seating and implement sustainable practices. Their expertise is crucial during the early stages of environmental assessment and sustainability planning (Dixon, 2007).
8. **Accessibility Consultants:** Accessibility consultants ensure that street seating complies with accessibility standards and advocates for inclusive design. Their input is vital during the accessibility assessment and recommendation stages (Imrie, 2012).
9. **Project Managers:** Project managers oversee project timelines, budgets, and stakeholder coordination. Their involvement spans the entire project lifecycle, from inception to completion, to ensure smooth execution and plan adherence (Kerzner, 2017).
10. **Maintenance Teams:** Maintenance teams plan for ongoing maintenance and ensure the durability and longevity of street seating. Their involvement begins post-installation and continues throughout the seating's lifespan to keep it in good condition (Salim, 2016).

From the above table, the current study contends that the effective design and implementation of street seating in urban public spaces rely on the collaborative efforts of various professionals, each bringing their expertise to different stages of the project. Urban planners lay the groundwork by assessing community needs and developing overarching plans, while architects and landscape architects ensure the aesthetic and functional integration of seating within the urban fabric (Carmona, 2014; Rogers,

2011). Meanwhile, industrial designers contribute by focusing on ergonomics and material selection, ensuring user comfort and sustainability (Norman, 2002).

Since civil engineers play a crucial role in the implementation stage, overseeing the construction and ensuring structural integrity, it is a heads-up that community engagement specialists should bridge the gap between the design process and the community, ensuring that the needs and preferences of the local population are considered (Ashford, 2013; Friedmann, 2011). At the same time, environmental engineers and accessibility consultants ensure that the designs are sustainable and inclusive, addressing broader social and environmental concerns (Dixon, 2007; Imrie, 2012).

Eventually, project managers oversee the entire process, ensuring that timelines and budgets are adhered to, while maintenance teams ensure the longevity and usability of the seating post-installation (Kerzner, 2017; Salim, 2016). The multidisciplinary approach enhances the functionality and aesthetic appeal of urban seating and ensures that the designs are sustainable, inclusive, and responsive to the community's needs. By integrating these diverse professional insights, urban planners can create more vibrant, liveable urban environments that foster social interaction and community engagement.

Finally, this section will close by presenting the conceptual table for street seating specifications obtained from the literature search. This table incorporates insights from academic scholars and UK furniture companies to obtain a thematic analysis for street seating design. This thematic data and table will serve as the measurement indicator for street seating design audits during the data collection phase.

2.9.5 Conceptual Frameworks of Street Seating Design Specifications

This research employs an interdisciplinary approach to street seating design by applying principles from sustainability, open public spaces, and street furniture. After a thorough review of the literature on these three main topics and related subtopics, this study examines product specifications provided by both industry and academic

experts. The study developed a conceptual framework for street seating specifications, incorporating insights from three furniture manufacturers and three scholarly sources from academic journals focused on street furniture research.

The conceptual framework for street seating specifications was carefully devised after an extensive review of relevant studies. It is intended to serve as the basis for evaluating street seating products in the case studies of this research. These insights from industry and academia offer a well-rounded understanding of street seating design principles and essential product specifications, guiding the evaluation and improvement of street seating in urban environments. The goal is to encourage active social behaviour and foster vibrant community interactions. Additionally, this study adopts an integrated approach to contribute to the ongoing discussion about active social behaviour while enhancing the quality and functionality of urban public spaces through innovative street furniture design, primarily street seating.

The three leading manufacturers, such as Bailey Street Furniture Group, Hardscape.co.uk, and Marshalls.co.uk, based in the UK street furniture design sector, boast over ten years of expertise and a diverse portfolio, including several case studies. Renowned for their well-established histories, these manufacturers have made a significant impact on the urban environment, creating a lasting legacy. Their unwavering commitment to innovation and quality has propelled them to the forefront of the industry. Known for their precise craftsmanship and meticulous attention to detail, they regularly deliver street furniture designs that enhance the efficiency and visual appeal of public spaces. With extensive experience and numerous case studies, these manufacturers consistently set the highest standards of excellence in street furniture design across the UK market.

Furthermore, strengthening the scholarly efforts of Allameh & Heidari, 2020, Ben Dhaou et al. 2022, and Yücel, 2013, has reinforced the dynamic landscape of street furniture and urban studies in the UK as centres of knowledge and innovation. Most of their studies demonstrate a keen interest in various aspects of urban design, gaining extensive experience through numerous publications and participation in related projects. Dedicated to advancing understanding and practical applications in urban

environments, they have led pioneering research initiatives and carried out impactful projects to enhance street furniture in public urban spaces. These academic institutions have played key roles in shaping the discussion around street furniture and urban studies through their collaborative and interdisciplinary approaches and engagement with industry stakeholders. Their collective efforts promote progress and foster innovation within the field, reflecting their lasting commitment to improving urban environments and enriching the lives of communities.

The next page presents the conceptual frameworks, including an overview of design approaches and specifications from various sources, along with additional frameworks. Data was collected from both scholarly academic journals and relevant companies for this study's purpose.

References	Street Seating Design Specifications							
Gökçen Firdevs Yücel (Yücel, 2013)	Functionality	Ergonomics	Materials	Configuration	Form	Colour	Texture	
Allameh and Heidari (Allameh & Heidari, 2020)	Eco-efficiently	Material wise	Energy Efficiency	Modularity	Dematerialisation	Design for Longevity	Promoting Social Behaviour	Economically
Ons Ben Dhaou (Ben Dhaou, Vasváry-Nádor, Gall, et al., 2022)	Location and Implementation Rules	Comfort	Accessibility	Technical Design Measurement	Harmonisation and City Image Promotion	Design and City Identity	Materials and Sustainability	
Bailey Street Furniture Group (Bailey Street Furniture Group, 2022)	Stylish & Aesthetics	Durable & Weather Resistant Materials	Comfortable and Suits Outdoor	Sustainability & Eco-Friendly Materials	Safety			
Hardscape.co.uk (Hardscape.co.uk, 2022)	ESCOFET <ul style="list-style-type: none"> • Aesthetic • Functional Design • Durability & Strength • Timeless Appeal 	ELEMENTALE <ul style="list-style-type: none"> • Versatility in Design • Aesthetic Appeal • Durability • Sustainability 	GREENLINE <ul style="list-style-type: none"> • Versatility in Design • Aesthetic Appeal • Durability • Sustainability • Configuration / Placement • Maintenance 	BESPOKE FURNITURE <ul style="list-style-type: none"> • Aesthetic Appeal • Unique and Innovative • Customizability • Integration • Stability • Craftsmanship • Contemporary or Heritage 				
Marshall.co.uk (Marshall.co.uk, 2022)	Innovative Design Partnership	Universal Design	Material Versatility	Structural Integrity and Safety	Sustainability and Environmental Considerations	Holistic Design Approach	Community-centric Design	

Table 2-4: Conceptual Frameworks of Street Seating Specification, Author, 2025.

2.9.5.1 The details of Product Specifications from the Academic Scholarly Journals

A. Gökçen Firdevs Yücel

- i. *Functionality*
The design should be tailored to meet the diverse needs of users, including individuals with impairments, ensuring inclusivity and varying comfort levels for different scenarios. For example, benches in high-traffic areas may prioritise quick rests, while park benches may be designed for more extended sitting periods.
- ii. *Ergonomics*
The seating should be ergonomically constructed to provide optimal support and comfort for the body, with well-made backrests and armrests to facilitate users' ease of sitting and standing. The seating should be adaptable to various user sizes and requirements.
- iii. *Materials*
Materials should be selected based on their capacity to withstand weather conditions, including rain, wind, and sunlight. They should be highly durable, resistant to graffiti, stains, and bacteria, and easy to clean. Recycled or eco-friendly materials are recommended to minimise the environmental footprint.
- iv. *Configuration*
The seating arrangement should facilitate social interactions and create a sense of community. This includes group seating arrangements and strategic placement with other amenities. The configuration should optimise the use of space, ensuring that seating areas do not obstruct pathways or create safety hazards. Some seating should be moveable to allow for flexible use and rearrangement by users.
- v. *Form*
The design should be visually appealing and complement the surrounding environment, fitting in with the local architecture and streetscape. Simple, clean designs are often preferred to reduce maintenance and improve longevity. The form can incorporate creative elements or artistic designs to add character and interest to the space.
- vi. *Colour*
To ensure visibility, the colours should contrast significantly with the background. A luminance contrast of at least 0.3 (30%) is recommended. The colour scheme should harmonise with other environmental elements, creating a cohesive and attractive space. Consider the psychological effects of colour on users, such as promoting calmness or energy.
- vii. *Texture*
Textures should be non-slip to ensure safety, especially in wet conditions. The texture should be comfortable to the touch without being too rough or smooth. Textures should be easy to clean and maintain, resisting dirt and wear.

B. Allameh and Heidari

- i. *Eco-Efficiency*
Eco-efficient products have a low environmental impact throughout their lifecycle. This includes making the product easy and cheap and reducing waste and energy use. It also involves reducing energy consumption during product use by using renewable energy or energy-efficient materials. Eco-efficiency also involves making products last longer and lowering replacements and environmental impacts.
- ii. *Material Wise*
Materials-wise, this also involves using non-toxic materials and safe manufacturing processes for humans and the environment. Material-wise, this also promotes a circular economy by designing products that can be reused or recycled.
- iii. *Energy Efficiency*
Energy efficiency is essential for product sustainability. LED lighting and energy-efficient electronics reduce energy demand during product use. Renewable energy sources like solar panels power the product, reducing fossil fuel use. Energy efficiency balances carbon emissions and removal to achieve carbon neutrality.
- iv. *Modularity*
Modular products have interchangeable parts that can be upgraded or replaced, extending their lifespan. Ensure the product is easily disassembled to encourage component reuse and recycling. Modularity also promotes easy maintenance and repair, reducing waste and replacement.
- v. *Dematerialisation*
Dematerialisation reduces product material without affecting functionality. It uses less virgin material and reduces product mass. It reduces waste by minimising packaging or using sustainable materials. Dematerialisation also involves reducing byproducts and waste, maximising recycled materials, and designing products with fewer materials for recycling.
- vi. *Design for Longevity*
Design for longevity creates long-lasting products. This involves creating long-lasting products to reduce replacements. It includes adapting the product to different uses and environments to keep it relevant and valuable. Design for longevity also emphasises flexibility and modularity to accommodate various functions, users, and times.
- vii. *Promoting Social Behaviour*
Social behaviour promotion involves designing products that promote sustainable and positive social interactions. Speed bumps to slow traffic are examples of coercive design. Decisive design, like custom trash bins that require sorting, also requires desirable behaviours. Interactive recycling bins that thank users for contributing are examples of persuasive design influencing social behaviour without coercion. Seductive design encourages behaviour change unconsciously by appealing to human tendencies, such as designing public spaces that naturally encourage social interaction and relaxation.

viii. *Economically*

Economic sustainability requires cost-effective recycling and a market for recycled materials. It also involves rewarding or discounting users who recycle or practise sustainability. Economic sustainability promotes local materials and manufacturing to cut transportation costs and boost the local economy.

C. Ons Ben Dhaou

i. *Location and Implementation Rules*

This framework emphasises the importance of ensuring accessibility for all individuals and promoting good circulation in outdoor public spaces.

ii. *Comfort*

Urban furniture is expected to encourage city dwellers and tourists to take time to enjoy the present moment and the surrounding landscape, thereby enhancing their comfort.

iii. *Accessibility*

The urban furniture must be arranged to promote the development of an obstacle-free route in outdoor public spaces, ensuring accessibility for all individuals.

iv. *Technical Design Measurement*

This framework involves analysing the design and quality of street furniture, which may lead to new activities in the space.

v. *Harmonisation and City Image Promotion*

Street furniture is recognised as a means of advertising and influencing the city's image in terms of aesthetic and visual appreciation.

vi. *Design and City Identity*

Urban furniture is acknowledged as a significant factor for municipalities to create a distinct identity for the city.

vii. *Materials and Sustainability*

This framework emphasises the design for using recycled materials with minimal negative environmental impact, promoting sustainability in street furniture design.

2.9.5.2 The details of Product Specifications from Industry Manufacturers

A. Bailey Street Furniture Group

i. Stylish and Aesthetics

The available style options encompass contemporary, classic, and modern designs characterised by beautiful and refined aesthetics well-suited for various outdoor environments. The design philosophy combines functionality with visual attractiveness, using high-quality materials to enhance the beauty of outdoor spaces and create inviting and pleasant environments.

ii. Durable and Weather-Resistant Materials

Materials used include steel, stainless steel, timber, granite, and recycled plastic sourced from quality manufacturers worldwide. These materials are engineered to endure diverse weather conditions, ensuring long-lasting performance and maintaining excellent conditions despite the elements' exposure.

iii. Comfortable and Suits Outdoor

Seating products are ergonomically designed for maximum user comfort. They are suitable for parks, plazas, urban streets, and various other outdoor environments, ensuring a pleasant seating experience.

iv. Sustainability and Eco-Friendly Materials

Sustainable design practices are incorporated, supporting sustainable development and environmental responsibility. Materials such as recycled plastic and sustainably produced lumber mitigate environmental impact and promote long-term resource preservation. Products are engineered to be both durable and environmentally conscious.

v. Safety

The robust design and polished surfaces ensure safety, offering a secure and comfortable seating experience for public use.

B. Hardscape.co.uk

i. ESCOFET

Aesthetic: The series is meticulously designed to enhance public spaces and bestow cities with refined elegance. The items feature sleek, modern designs that are visually appealing and enhance the aesthetic quality of urban environments.

Functional Design: Emphasizing the integration of form and function, each item, from seating to lighting fixtures, is crafted to deliver both aesthetic appeal and practical utility. This includes ergonomic seating solutions and optimal lighting configurations tailored for public use.

Durability and Strength: The collection is engineered for durability and robustness, utilising high-quality, long-lasting materials. ‘Escofet’s’ expertise in concrete component fabrication ensures that the products can withstand adverse weather conditions and the rigours of public use. This involves using premium materials, advanced construction techniques, and low-maintenance designs.

Timeless Appeal: Designed with longevity in mind, the items feature classic, enduring styles that remain unaffected by transient trends. This ensures that the street furniture maintains its relevance and appeal over time, providing lasting value to urban landscapes.

ii. *ELEMENTALE*

Versatility in Design: Especially in Shapes that could encompass curved, straight, and tailor-made elements, enabling imaginative and personalised designs to accommodate any outdoor area while guaranteeing resilience and robustness.

Aesthetic Appeal: The product is enhanced using hardwood, such as “Cumaru”, which is mounted onto a galvanised steel frame using anti-theft bolts. The frame is specifically built to allow for easy removal when repair is required. A conventional translucent, aqueous coating that enriches the inherent wood pattern and imparts a more inviting hue.

Durability: It utilises durable materials, emphasising bamboo due to its environmentally friendly properties. Bamboo is a sustainable alternative to tropical hardwood, growing within 4 to 6 years. It absorbs more CO₂ and possesses exceptional hardness and density.

Sustainability: It is economically viable and efficient for outdoor environments, features inventive design and practicality, and offers customisation options for distinctive and imaginative outdoor locations and surroundings.

iii. *GREENLINE*

Versatility in Design: The range includes curved, straight, and bespoke concrete elements, which can be installed inward or outward obliquely and are available in heights of 30 cm and 45 cm, allowing for creative and customised outdoor designs.

Aesthetic Appeal: Seating kerbs are suggested to provide a natural, warm aesthetic, such as laminated bamboo or FSC® hardwood seats. Meanwhile, concrete units can form green strips or islands, enhancing visual appeal.

Durability: The elements, which utilise concrete and bamboo, are durable, resistant to vandalism and frost, and designed to minimise maintenance while increasing the visibility of pollution and vandalism.

Sustainability: It suggested choosing durable and long-life materials such as Bamboo, which matures in 4 to 6 years and absorbs nearly five times as much CO₂. It is durable

(class 1), impervious to wood rot, and has a hardness of 4.0 kg/mm² and a density of 700 kg/m³, making it eco-friendly.

Configuration / Placement: The elements are ideal for protecting green zones and planter kerbs in urban areas from intensive city traffic. They are standard lengths of 2m and widths of 15cm. They have a slender, light profile and a concrete base for a firm foundation.

Maintenance: To maintain the seating's attractiveness, warm colour, and appearance, bamboo should be oiled at least once a year, especially in horizontal areas, to slow natural wear and reduce contaminants and algae accumulation.

iv. *BESPOKE FURNITURE*

Aesthetic Appeal: Utilises a natural material such wood and metal to enhance the visual appeal of urban spaces. Designs are created to be both functional and beautiful, enhancing the area's attractiveness.

Unique and Innovative: Develops unique shapes, features, and creative designs that stand out. Offers inventive design solutions that add character and originality to public spaces.

Customizability: Provides customisable solutions for specific urban requirements and cultural contexts. Adapts furniture to suit the unique character and needs of different outdoor locations.

Integration: Design furniture to integrate seamlessly with the urban landscape. Ensure the design and materials complement the area's architectural and cultural context. Include ergonomic and practical features catering to the daily needs of urban dwellers.

Stability: It uses robust materials and construction techniques for stability and durability. It chooses materials that offer durability and require minimal maintenance.

Craftsmanship: This style emphasises high-quality craftsmanship with meticulous attention to detail. It uses premium materials and construction methods for longevity and beauty.

Contemporary or Heritage: It incorporates contemporary design elements reflecting current trends, enhancing user comfort, functionality, and aesthetic appeal. It also respects and incorporates historical and cultural elements.

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i. *Innovative Design Partnership:*

Industry designers are suggested to collaborate to create innovative and functional seating designs. We are also open to tailoring seating solutions to specific project needs.

- ii. *Universal Design:*
All seating designs meet the Disability Discrimination Act standards, ensuring accessibility and are designed to accommodate users of all ages and abilities.
- iii. *Material Versatility:*
Various materials are used, including concrete, steel, stainless steel, natural stone, polyurethane, aluminium, cast iron, timber, and recycled plastics. Each material is chosen for its unique properties, such as durability and aesthetics.
- iv. *Structural Integrity and Safety:*
Seating designs conform to the British Standard for structural safety, and designs are independently assessed by structural engineers.
- v. *Sustainability and Environmental Considerations:*
Considering the environmental impact of their seating, using sustainable materials and processes. The use of recycled plastics and other sustainable materials is encouraged.
- vi. *Holistic Design Approach:*
Offering seating ranges that can be easily integrated into any landscape design, such as modular seating systems, allows for flexible configurations.
- vii. *Community-centric Design:*
Encourages community participation in the design process, and designs are often inspired by local environments and cultural contexts.

Eventually, the theme frameworks for street seating audits are prepared to provide a comprehensive and systematic approach to evaluating the current street seating design in urban public spaces at selected case study locations. These frameworks are developed by thoroughly examining previous research and data from corporations and academic experts. The aim is to ensure that future street seating adequately meets the diverse needs of urban residents and promotes active social behaviour.

The following table presents the thematic frameworks of design approaches and specifications for street seating design. Nine design approaches were developed and derived from the conceptual frameworks. Each approach includes specific design specifications, providing clear and understandable criteria for the design of street seating.

2.9.6 Thematic Frameworks for Street Seating Audit.

Thematic Framework of Street Seating Design Approach and Specifications									
Design Approaches	Accessibility & Inclusivity	Aesthetic & Visual Appeal	Materials; Sustainability & Durability	Ergonomics, Comfort & Functionality	Energy Efficiency, Modularity & Dematerialisation	Customizability & Integration	Craftsmanship, Timeless Appeal & Design Influences	Economic Sustainability & Community-Centric Design	Innovation, Originality & Social Behaviour Promotion
Design Specification	Ensure that street seating promotes accessibility for all individuals and facilitates smooth movement in outdoor public spaces.	Evaluate the aesthetic attractiveness of street seating, its harmonisation with the surrounding environment, and adherence to design principles.	Assess the utilisation of sustainable materials, the environmental impact and the durability of street seating.	Evaluate the comfort, ergonomic features, and practicality of street seating configuration.	Assess the energy efficiency, modularity, and reduction of material usage in street seating.	Evaluate the customizability of street seating and its integration with the urban landscape.	Assess the craftsmanship, timeless appeal, and design influences of street seating.	Assess the long-term financial viability and level of community engagement in the design process.	Assess the uniqueness, originality, and social behaviour promotion of street seating.

Table 2-5: Shows the Thematic Framework generated from the analysis of Conceptual Frameworks – Source Author, 2025

Details are explained below.

1. Accessibility and Inclusivity

- **Objective:** Ensure that street seating promotes accessibility for all individuals and facilitates smooth movement in outdoor public spaces.
- **Evaluation Criteria:**
 - Is the seating arranged to provide an obstacle-free route?
 - Does it provide accessibility for those with disabilities and impaired mobility?
 - Does it provide easy mobility and navigation within the seating area?
 - Does the implementation adhere to relevant standards and guidelines?

2. Aesthetic and Visual Appeal

- **Objective:** Evaluate the aesthetic attractiveness of street seating, its harmonisation with the surrounding environment, and adherence to design principles.
- **Evaluation Criteria:**
 - Does the seating complement the surrounding architecture and streetscape?
 - Is the design visually appealing and harmonious with other environmental elements?
 - Do the colours employed have enough contrast to guarantee visibility and provide a cohesive space?
 - Do the textures possess non-slip characteristics, provide comfort, and require minimal effort for maintenance?

3. Material; Sustainability, and Durability

- **Objective:** Assess the utilisation of sustainable materials, the environmental impact and the durability of street seating.
- **Evaluation Criteria:**

- Are sustainable materials like bamboo, recycled plastic, or FSC® hardwood used?
- Does the seating contribute to environmental sustainability?
- Is the seating specifically engineered to need minimum maintenance and exhibit long-lasting durability?
- Are durable materials and construction processes employed to guarantee stability?

4. Ergonomics, Comfort, and Functionality

- **Objective:** Evaluate the comfort, ergonomic features, and practicality of street seating configuration.
- **Evaluation Criteria:**
 - Does the seating include ergonomic design principles to ensure maximum support and comfort?
 - Is it capable of accommodating a wide range of user sizes and requirements?
 - Do the seats accommodate various lengths and seating situations?
 - Does seating configuration encourage city dwellers and tourists to enjoy the surrounding landscape?

5. Energy Efficiency, Modularity, and Dematerialization

- **Objective:** Assess the energy efficiency, modularity, and reduction of material usage in street seating.
- **Evaluation Criteria:**
 - Are energy-efficient materials and renewable energy sources used?
 - Can the seating be easily disassembled for component reuse and recycling?
 - Is the seating designed with minimal material use without compromising functionality?

6. Customizability and Integration

- **Objective:** Evaluate the customizability of street seating and its integration with the urban landscape.
- **Evaluation Criteria:**
 - Can the seating be customised to meet specific urban requirements and cultural contexts?
 - Does it smoothly and effortlessly blend into the urban environment?
 - Do the design and materials harmonise with the architectural and cultural background of the area?
 - Do the design and functionality of the product consider the specific daily requirements of urban locals?

7. Craftsmanship, Timeless Appeal, and Design Influences

- **Objective:** Assess the craftsmanship, timeless appeal, and design influences of street seating.
- **Evaluation Criteria:**
 - Does the work exhibit high-quality craftsmanship evident with meticulous attention to detail?
 - Does the design incorporate timeless and enduring styles that maintain relevance over time?
 - Are contemporary design elements balanced with historical and cultural influences?

8. Economic Sustainability and Community-Centric Design

- **Objective:** Assess the long-term financial viability and level of community engagement in the design process.
- **Evaluation Criteria:**
 - Are cost-effective recycling and sustainable materials used?
 - Does the seating promote local materials and manufacturing?

- Does the design draw inspiration from local surroundings and cultural contexts?
- Does the arrangement of seats promote community participation and facilitate social interactions?

9. Innovation, Originality, and Social Behaviour Promotion

- **Objective:** Assess the uniqueness, originality, and social behaviour promotion of street seating.
- **Evaluation Criteria:**
 - Does the seating feature unique shapes, features, and creative designs?
 - Are innovative solutions offered to add character and originality to public spaces?
 - Does the seating noticeably and effectively improve the visual attractiveness of the area?
 - Does the design facilitate and encourage pleasant interactions and active social behaviour?

These thematic frameworks encompass the essential design approaches and specifications for street seating design, offering a thorough manual for conducting a street seating audit. The review considers several factors, such as accessibility, aesthetics, sustainability, comfort, durability, safety, customisability, economic sustainability, community involvement, innovation, and promotion of social behaviour. The research uses these frameworks to improve street seating in urban public spaces. It aims to develop effective and innovative street seating designs that encourage social interaction to blend with the surrounding urban public spaces.

2.9.7 Chapter's Conclusion

This chapter provides a comprehensive review of the theoretical, conceptual, and empirical foundations that underpin this study. It began by situating the research within the broader discourse on **sustainability**, highlighting the global shift toward developing urban environments that balance ecological responsibility, economic viability, and human well-being. In this context, the **Triple Bottom Line (TBL)** framework was analysed as a guiding model for sustainable development. Although TBL emphasises the importance of integrating environmental, economic, and social values, the literature shows that applications in urban design, particularly in street furniture design, are disproportionately focused on environmental performance and financial efficiency. This imbalance highlights the need to enhance the **social sustainability** aspect within design practice.

A closer examination of **social sustainability** highlighted its core emphasis on enhancing community well-being, inclusivity, equity, and opportunities for meaningful social interaction. However, studies consistently demonstrate that the social dimension is the least developed within urban design guidelines. These gaps become more pronounced when considering **active social behaviour**, which encompasses informal interactions, community bonding, play, resting, lingering, and spontaneous encounters. Although many scholars and studies have emphasised the importance of design in shaping behaviour, there remains limited guidance on how street furniture design, specifically street seating, can be intentionally designed to cultivate such behaviours.

The chapter then narrowed its focus to the role of **urban public spaces**, recognising them as vital settings where social life unfolds and where social sustainability is most visibly enacted. The review examined the distinctions and tensions between **Public Open Spaces (POS)** and **Privately Owned Public Spaces (POPS)**, highlighting how governance, ownership, and access impact inclusivity and user experience. This discussion extended to **urban units**, acknowledging that the success of public spaces is closely tied to surrounding built forms, cultural dynamics, and patterns of movement and occupation.

Within these environments, street furniture particularly street seating has emerged as a vital micro-infrastructure that directly influences people's comfort, safety, sociability, identity formation, and engagement with the place. The literature consistently affirms that seating is not merely a functional amenity but a behavioural catalyst capable of shaping how individuals gather, interact, pause, observe, or participate in public life. However, despite this significance, studies reveal substantial shortcomings in current seating design, including inadequate ergonomics, poor placement strategies, lack of inclusivity, limited material innovation, and inconsistent maintenance standards.

Furthermore, issues related to durability, environmental performance, cost efficiency, maintenance responsibilities, and long-term usability highlight significant design and management challenges. Many existing seating solutions prioritise aesthetic uniformity or cost-saving measures at the expense of contextual sensitivity, long-term user comfort, and cultural identity. Material choices often overlook climatic considerations, sustainability requirements, or behavioural implications, resulting in underused or socially ineffective seating.

Taken together, the **literature reveals several key gaps** that shape the direction of this study:

1. **A limited integration of the social dimension of the TBL framework** in street furniture design, particularly in the context of encouraging active social behaviour.
2. **Insufficient design guidelines** that holistically account for ergonomics, comfort, inclusivity, cultural context, material performance, and behavioural outcomes.
3. **A lack of contextualised frameworks for street seating**, despite its proven significance in shaping micro-social interactions in urban public spaces.
4. **Weak connections between research and practice**, where many design decisions remain based on generalised standards rather than evidence from user behaviour, expert insight, and real-world performance.
5. **Limited recognition of behavioural dynamics**, such as lingering, observing, gathering, and socialising, which are critical for social sustainability.

Recognising these gaps, the current study proposes a **conceptual framework** developed through an extensive synthesis of academic research, expert evaluations, observational insights, and corporate practices. This framework serves as a foundation for identifying the essential considerations required to design street seating that meaningfully supports the diverse needs of urban residents.

From this conceptual foundation, **nine design approaches** were established. Each approach is supported by specific design specifications that provide clear, actionable, and context-sensitive criteria for practitioners, policymakers, and designers. Collectively, these approaches aim to ensure that future street seating not only fulfils basic functional requirements but also acts as a catalyst for **active social behaviour**, enhancing the inclusivity, vibrancy, and social sustainability of urban public spaces.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Chapter Introduction

As mentioned earlier in Chapter 1, this research aims to investigate “*How might street seating design contribute to active social behaviour for social sustainability in cities' public spaces*”. The study examines various street furniture designs in this context, with a specific focus on street sitting. It explores how people utilise and engage with street seating in shopping areas situated in the northwest region of a UK city centre. The research also aims to understand how members of the public utilise street furniture and how their daily activities relate to active social behaviour, promoting social sustainability. Hence, the chapter will outline the methodologies employed throughout the entire study process. It describes the research approach and strategy, including the data collection and analysis methods used in this thesis to achieve the aim and objectives.

3.2 Section 1: Research Plan

3.2.1 Research Design

This section outlines the research design, explaining the key considerations that drive the data collection process and providing the rationale behind the chosen methodology.

Philosophical Foundation

The philosophical foundation of this investigation is derived from two discrete types of knowledge—"intuitive knowledge" and "authoritative knowledge" (Kivunja and Kuyini 2017). Intuitive knowledge, also known as a gut feeling or intrinsic comprehension, is acquired conscious thought or empirical evidence. It encompasses intuition, personal experiences, and subconscious processing. Authoritative knowledge originates from well-established expertise, formal education, and reputable

sources, including research, evidence, and expert opinions from professionals, scholars, and institutions. These elements substantially influence the present study, prioritising the human aspects over a mere reliance on empirical data (Prvanov, 2017).

Human-Centric Perspective

This research emphasises human aspects, such as individual experiences, perceptions, and qualitative insights, rather than solely relying on quantitative metrics. Although empirical data were gathered through observations and surveys, the analysis and interpretation were shaped by a human-centred perspective, highlighting its positive influence on social sustainability. Various stakeholders, including authorities, designers, members of the public, and others, actively participate in problem identification, exploration, and the development of a new urban character.

Research Approach

This study adopts an exploratory research approach, aiming to describe and investigate contemporary phenomena within real-life contexts to provide evidence (Yin., 2003). The focus is on analysing the relationship between street seating design, active behaviour, and societal sustainability. By combining qualitative methods (observation of products, interviews, and participatory design workshops) with quantitative methods (surveys and behavioural observations), the research seeks to develop a comprehensive understanding of the complex factors influencing active behaviour in urban public spaces. Using mixed methods allows for a thorough exploration of the research questions and offers detailed insights to inform recommendations for improving urban public spaces, particularly street seating design (Yin., 2003).

Rationale for Mixed-Method Case Study

The study aims to offer valuable recommendations for generating concepts and assisting designers in analysing factors that positively influence active social behaviour for social sustainability through street seating design. To achieve this, the research concludes that a mixed-method case study is most suitable for gathering rich and comprehensive data. Creswell & Clark Plano (2018) emphasise that case studies enable researchers to collect extensive information from various sources, such as interviews, observations, and documents, providing a holistic understanding.

Another opinion by Creswell (2018, p. 327) is that “*case studies are a qualitative design in which the researcher explores in depth a program, event, activity, process, or one or more individuals. The case(s) are bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time.*”

Type of Questions and Research Methods

According to Yin., (2003), questions beginning with “*how*” and “*why*” are typically case studies that impose an explanatory nature to the research, eliciting rich, detailed information (Gall et al., 1996). Meanwhile, a “*what*” question is usually imposed as an exploratory study, often favouring survey or archival methods (Yin, 2003).

Table 3.1 provides an in-depth rationale of how the research objectives can be obtained from the research questions through the utilisation of “*how*”, “*why*”, and “*what*” inquiries. Additionally, it provides a comprehensive description of the research method employed for each research question.

<i>Type of Questions</i>	<i>Research Methods</i>	<i>Research Objectives</i>
HOW and WHY	Walk-by Observation, Interviews & PDW	Exploratory research to finds out the main issues of a problem that hasn’t been studied enough. (OB1, OB3 & OB4)
WHAT	Surveys & Walk-by Observation	Explanatory research to determine what causes and affects a problem that has been studied extensively. (OB2)

Table 3-1: Research Design Methodology Table

Detailed Explanation of Research Approach

- i. **Observation:** Explores street seating users' preferences and tendencies by monitoring and documenting seating design use without proving causality. The goal is to gather street seating design insights and behaviour patterns. This

helps determine how people organically use the infrastructure, what features they like, and how long they use it. It can also help identify what behaviours or patterns are present in each context of the observation details. According to Mehta and Bosson (2021), ‘visual surveys’ help to measure urban design qualities.

- ii. **Surveys:** Aim to collect quantitative data on the public's experiences and preferences concerning street seating design. The research employs specific questions to explore aspects such as user satisfaction, connection to socialising, physical usage patterns, design preferences, comfort levels, duration of use, and suggestions for improvement. The gathered data is crucial for understanding why certain design elements are favoured or disliked, their impact on user behaviour, and factors contributing to overall satisfaction. The goal is to explain relationships between street seating design elements and public experiences, providing insights into how design influences user behaviour and preferences.
- iii. **Interviews:** These interviews are conducted with professionals to uncover design principles, best practices, design processes, new concepts, and logic. The idea is to use professionals' knowledge to better understand the field, design issues, and prospective street furniture innovations. These interviews also explain design decisions, clarify design philosophies, and connect design elements and user behaviours based on expert opinions and experiences.
- iv. **Participatory Design Workshops (PDWs):** Used to investigate and determine the fundamental elements of street seating design that impact social behaviour. These workshops, classified as exploratory research, engage professionals such as industrial designers, engineers, and urban architects. Their expertise guarantees that the insights and recommendations are based on professional knowledge, improving the quality and relevance of the findings.

Research Questions and Research Approach

The author used multiple data collection methods to improve the validity of the case study research. This approach provided thorough evidence for broader exploration and data triangulation, as recommended by Altrichter et al. (1996), who state that triangulation aims to *"give a more detailed and balanced picture of the situation"* (p.117). The data was gathered in four phases from March to September 2018. Revisiting the research questions offers a deeper understanding of the methodology's structure.

As outlined in Chapter 1, the research objectives guide the following research questions and their corresponding research approach:

Research Question	Research Approach
1. How does current street seating design affect active social behaviour in UK urban centres, such as Manchester and Liverpool?	➤ Observation ➤ Interviews
2. How do members of the public use street seating in UK city centres?	➤ Observation ➤ Surveys
3. What are the essential components for driving active social behaviour via street seating design?	➤ Surveys ➤ PDW
4. How might we develop recommendations to emphasise the importance of active social behaviour for social sustainability through street seating design?	➤ PDW ➤ Interviews

Table 3-2: Illustrates How Data Collection Methods and Research Questions are aligned.

3.3 Research Approach Aligns with Research Questions and Objectives

The research employs a systematic methodological approach to achieve its goals, ensuring that all design strategies are legitimate and pertinent to the research questions and objectives. The table below details the main methods, which include:

RQ No	Research Approach	Research Description
1 & 2	(Observation) Street Seating Audit	i. The researcher thoroughly examined the current street seating in the case study area to determine its effectiveness. This audit follows the criteria derived from the thematic frameworks developed in Chapter 2.
		ii. The researcher aggregated score data to determine the lowest and highest rankings and other relevant data related to this research.
RO: To explore current street seating design		
1 & 2	(Observation) Walk-by Observation	i. The researcher recorded authentic active social behaviour with street seating in the case study location.
		ii. The observational data corroborate and enhance the street seating audit findings by detecting synchronisation and inconsistencies and witnessing various active social behaviours in the case study sites.
RO: To understand how public members use street seating in UK city centres.		
2 & 3	Surveys	i. Collect quantitative data on user perceptions and preferences.
		ii. The survey data are cross-referenced with the results of the Walk-by Observation to verify the impacts of active social behaviours and other contributing factors.
RO: To understand how public members use street seating in UK city centres to establish the essential components that drive active behaviour for social sustainability via street seating design.		
1 & 4	Interview	i. Conduct interviews with experts and stakeholders to gather qualitative insights that provide context and depth to the data collected from the audit, observations, and surveys.

RO: To develop recommendations that emphasize the importance of active behaviour through street seating design for social sustainability.	
3 & 4	Participatory Design
	Workshop (PDW)
	<ul style="list-style-type: none"> i. This workshop involves users and experts in a cooperative approach to exploring and refining street seating concepts. ii. This iterative method ensures that designs are human-centred and appropriate to the specific context.
RO: To develop recommendations that emphasize the importance of active behaviour through street seating design for social sustainability.	
1,2,3 & 4	Validating Knowledge Contribution
	<ul style="list-style-type: none"> i. The crucial factors are identified, and further validation is carried out with stakeholders through active engagement to enhance the validity of the current research's knowledge contribution.
RO: To align and confirm the knowledge contribution with professional insights, validation from industry experts is crucial. By engaging with professionals in the field, the PhD study's findings are assessed for relevance and applicability, ensuring that the research contributes meaningfully to existing knowledge and enhances its credibility and impact within the academic and professional communities.	

Table 3-3 Presented Research Approach Aligns with Research Questions and Objectives

3.4 Data Analysis Techniques: Content and Thematic Analysis for Triangulation

This study uses content and theme analysis to extract and analyse keywords from observational data, interviews, surveys, and participatory design workshops. These strategies are employed to achieve solid data triangulation, providing a thorough knowledge of the research findings.

1) The procedure **begins with coding**, during which data is thoroughly evaluated to discover significant or often cited terms and phrases essential for recognising patterns and trends. 2) **Frequency analysis** is conducted to assess keywords based on their frequency, enabling the identification of prominent themes and concerns articulated by participants. 3) **Thematic analysis identifies**, evaluates, and illustrates patterns or themes within the data. In theme identification, codes are organised into overarching themes that represent the essence of the data; for instance, codes related to "comfort" and "ergonomics" may be *grouped under the subject* "User Comfort." Themes are assessed to confirm their appropriate data representation and refined to ensure comprehensive coverage without redundancy. 4) **Triangulation** is utilised to corroborate conclusions by comparing many data sources. 5) This **involves cross-validation**, wherein themes and keywords obtained from each approach are compared to ensure consistency and dependability, confirming the findings' validity. 6) Ultimately, **integration synthesises findings** from several approaches to comprehend the research topic thoroughly. This approach enriches the research by integrating both quantitative and qualitative perspectives, providing a strong foundation for the study's conclusions.

Data Collection Stage Schedule

Subsequently, the case study design for this research was organised into four parts, beginning in March 2018 and ending in September 2018. Only interviews were conducted continuously, based on the professional availability of the participants.

Stage	Data Collection	Time Frame
Stage I	<i>Walk by Observation</i> - Conducted initial observations of street seating usage in Manchester and Liverpool.	(March 2018)
Stage II	<i>Surveys</i> - Distributed surveys to gather public opinions and usage patterns.	(from May 2018 to August 2018)
Stage III	<i>Interviews</i> - Conducted interviews with key stakeholders and experts.	(from July 2018 to March 2019)
Stage IV	<i>Participatory Design Workshop</i> - Held workshops to involve community members and experts together in the design process.	(September 2018)

Table 3-4: Data Collection Stage Schedule

The following page presents a diagram in Figure 3.1 that explains this study's research design, and the subsequent page visually summarises the research methodological flow process in Figure 3.2, aligning it with the research design. The study is structured into three phases: background studies, data collection and analysis, and triangulation and discussion. Together, these phases encapsulate the knowledge gained throughout the research.

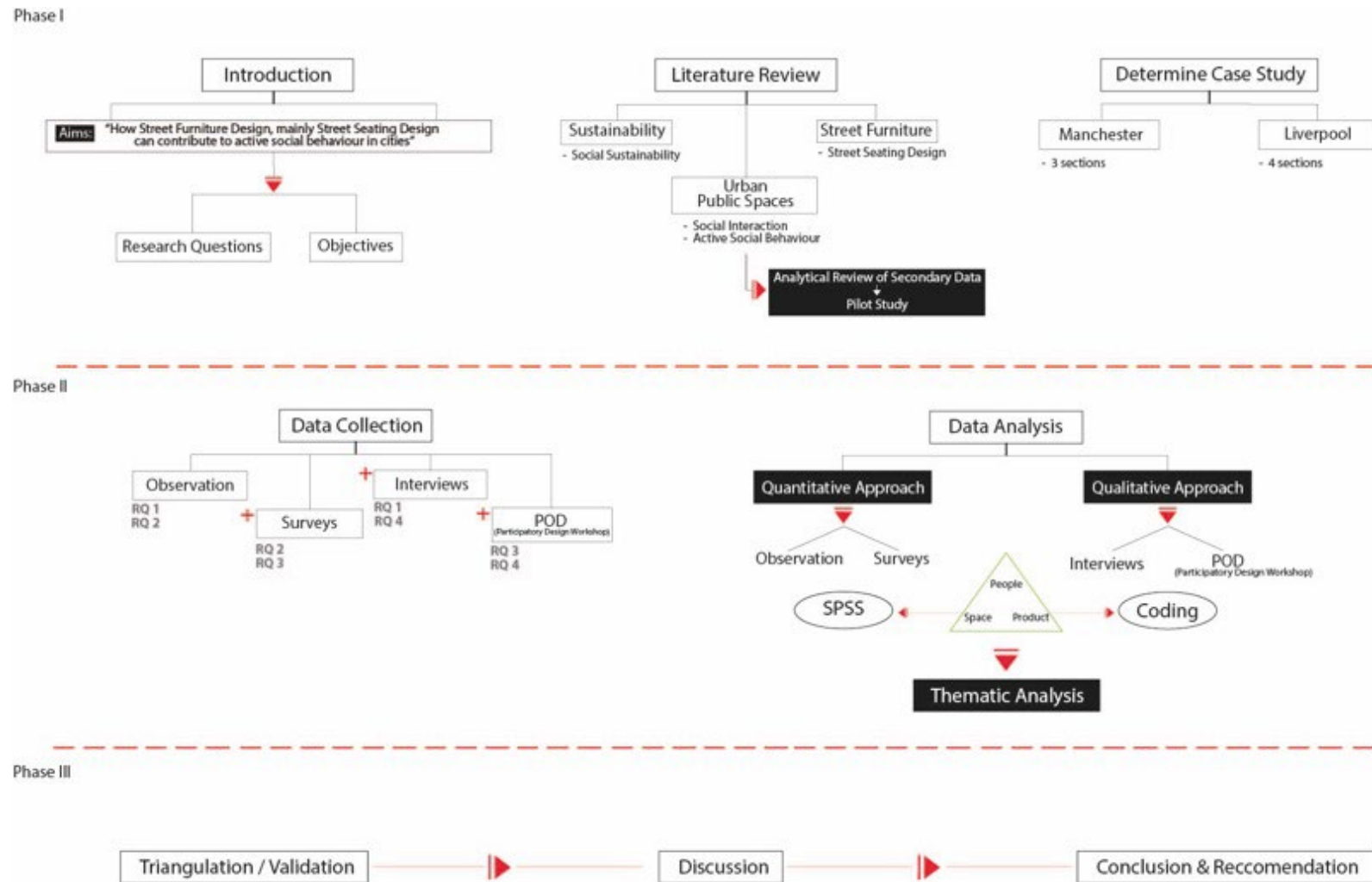


Figure 3-1 Research Design

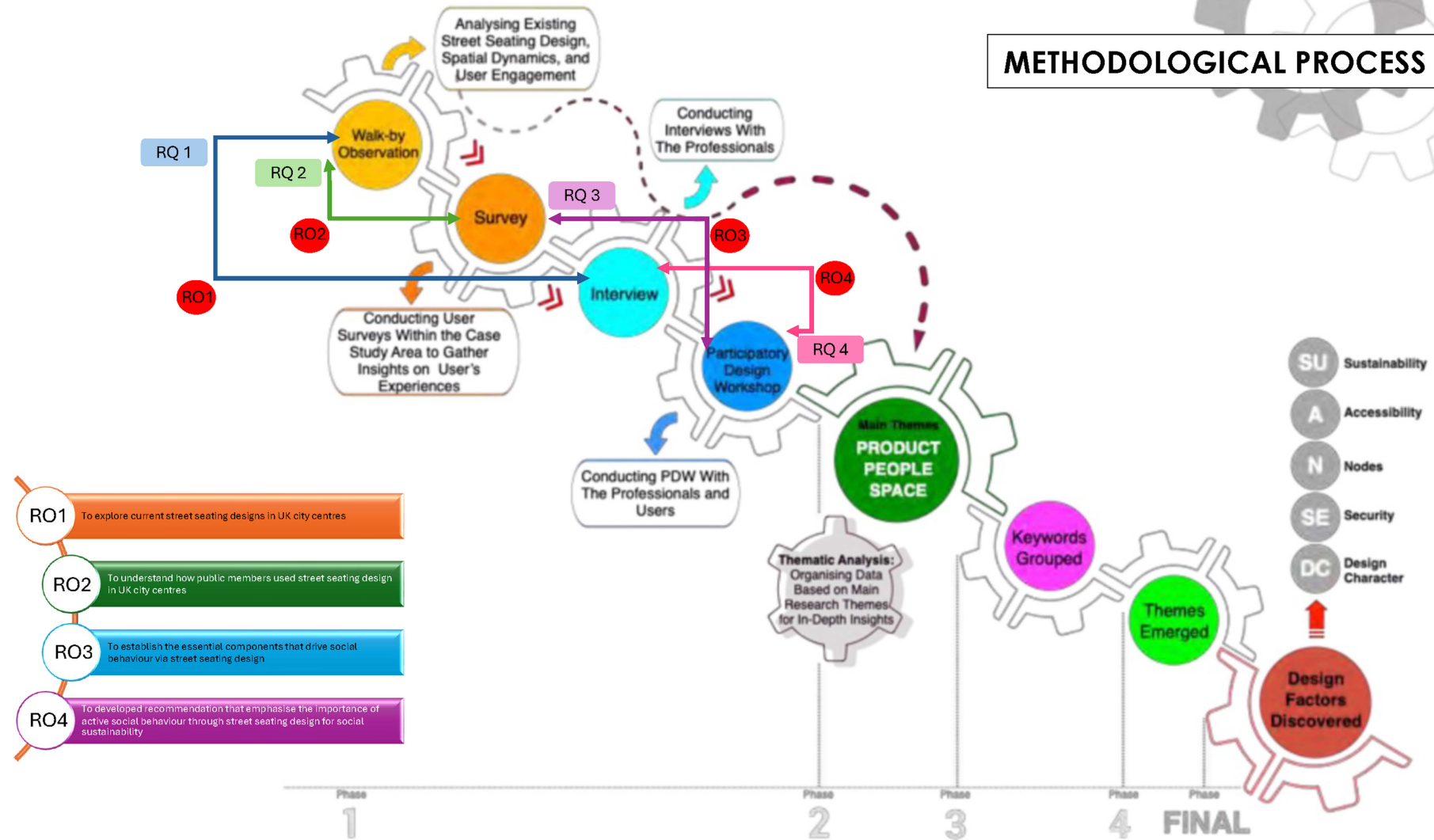


Figure 3-2 Comprehensive Research Design for Evaluating Social Sustainability through Street Seating

3.5 Case Study Approach

Case studies have a well-established history in social science research and business education (Martin & Hanington, 2019). Breslin & Buchanan (2008) assert that their value has recently been recognised in design practice and education, both for design research and teaching and for case study writing by designers. They are beneficial in exploratory research for understanding existing phenomena, making comparisons, gathering information, or finding inspiration.

According to the literature, case studies produce compelling and memorable narratives, making findings more engaging and easier to understand. They are flexible and adaptable to various research questions and contexts and often provide practical insights and solutions applicable to real-world situations (Breslin & Buchanan, 2008; Ebneyamini & Sadeghi Moghadam, 2018; Martin & Hanington, 2019).

Within the current study on street seating design in urban public areas, case studies are essential as they offer detailed observations on how street seating influences social interaction. By analysing specific urban environments, researchers can identify design elements that promote or inhibit social interaction, providing practical suggestions for improving public spaces. Although they have limitations, case studies can uncover patterns and generate hypotheses that inform broader urban design contexts (Martin & Hanington, 2019).

Nevertheless, case studies have limitations, including the possibility of researcher bias, limited generalisability due to a focus on specific events, and the time-consuming nature of collecting and analysing data (Ebneyamini & Sadeghi Moghadam, 2018). The drawback of limited generalizability means that findings from one urban setting may not apply universally. However, by conducting multiple case studies across different urban contexts, researchers or designers can identify common themes and design principles that promote social sustainability (Martin & Hanington, 2019). This approach can also mitigate researcher bias by cross-verifying data across various sources and contexts (Breslin & Buchanan, 2008; Ebneyamini & Sadeghi Moghadam, 2018),

thereby ensuring a more balanced and comprehensive understanding of how street seating can facilitate social interaction and enhance community well-being.

Therefore, to strengthen the input and gain a better understanding of this research, this study employs a multiple or instrumental case study approach, which includes walk-by observations, surveys, interviews, and participatory design workshops (PDWs). According to Creswell & David Creswell (2018), a multiple case study strategy involves analysing several cases to develop an understanding of a phenomenon, whereas an instrumental case study focuses on gaining insights into a specific issue or refining a theory. The research in this context aims to evaluate the potential of street seating design to promote active social behaviour in retail areas. Creswell also explains as follows,

"A case study explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information...and reports a case description and case themes."

(2013:97)

Thus, using various case studies, as suggested by Eisenhardt and Graebner (2007, cited in Gustafsson, 2017), improves data collection and makes it easier to build a strong theory (see also Baxter & Jack, 2015, and Yin, 2003). Multiple case studies reveal both the similarities and differences in the design challenges encountered when creating street seating in two cities. According to Ebneyamini and Sadeghi Moghadam (2018), evaluating multiple cases offers a range of perspectives and helps identify familiar patterns, thereby increasing the reliability of the findings. The study also noted that by comparing different cases, researchers can validate the consistency of their findings across diverse contexts, thereby refining theories and improving accuracy.

Therefore, the current research argues that utilising multiple case studies improves understanding of the subject. It is valuable for developing and refining theories because they provide empirical evidence and uncover new patterns. Additionally, Martin and Hanington (2019) describe the case study technique as illustrating broad ideas or concepts through concrete and relatable examples, thereby improving the clarity of

theoretical ideas. Using various data collection methods, such as interviews, observations, and document analysis, increases the richness of the data and the insights gained (Crowe et al., 2011). Case studies offer a comprehensive view by examining the entire system and its interconnections, making them more informative than studying isolated parts. Therefore, this approach is suitable for exploring how street seating influences social interactions and community well-being in different urban settings, as it allows for a detailed and accurate understanding of the phenomenon.

Given the need for an inclusive and accessible research environment, the decision to use public open spaces (POS) in case studies, as opposed to privately owned public spaces (POPS), was influenced by the constraints associated with private spaces. Private spaces often present challenges in accessing data and conducting thorough inquiries due to proprietary concerns, restricted entry, or limited public accessibility. In contrast, public open spaces provide a more accessible and inclusive environment for conducting research. This accessibility ensures a more comprehensive and representative understanding of street seating design and its impact on social interaction and community well-being.

Focusing on Public Open Spaces ensures greater transparency, accessibility, and the ability to gather more data, addressing these challenges (Andersson, 2016). However, it is essential to note that while the primary focus is on Public Open Spaces, the outcomes of this research are not intended to be exclusive to such spaces. The findings and insights derived from this study can offer valuable perspectives for the private sector managing privately owned public spaces (POPS). These organisations can utilise the research findings to enhance the planning and administration of their physical settings. For instance, they can apply established guidelines observed in public open areas to improve the user experience. This can involve optimising seating configurations to promote social engagement, integrating green elements to boost visual attractiveness and well-being, and ensuring accessibility for all individuals (Mohapatra & Mohamed, 2013).

Moreover, these observations can assist the private sector in harmonising their premises with the community's requirements and urban policy objectives, thus enhancing the overall efficiency and inclusiveness of their privately owned public spaces (POPS).

According to de Magalhães & Carmona (2009) and Mohapatra & Mohamed (2013), every public place, regardless of its inclusivity, democracy, and openness, necessitates some level of administration to serve its diverse functions adequately. Ultimately, private managers can enhance the appeal and functionality of spaces by using such concepts, thus improving public services and contributing to the broader urban environment.

3.5.1 Case Study Locations

The research focused on public spaces outside retail areas in northwest England, notably in the city centres of Liverpool and Manchester. This research selected urban areas of Manchester and Liverpool based on their substantial populations and thriving retail sectors. Manchester has an estimated population of roughly 2.55 million, while Liverpool has over 1.6 million. Liverpool is acknowledged as one of the largest retail hubs in the United Kingdom, significantly influencing the city's retail sector (Dolega & Lord, 2020). Manchester is a substantial urban county in Northwest England, with lively commercial streets and districts that have enjoyed economic prosperity from the early Victorian period (Greater Manchester Combined Authority, 2019; Williams, 1996).

Manchester City Centre's 2012 strategy plan, presented in 2009, aimed to improve the urban environment and enhance service delivery by addressing concerns such as business crime and anti-social behaviour (Manchester City Council, 2012). At the same time, Liverpool spearheaded a revolutionary urban development project called Liverpool ONE, which completely transformed the city centre and demonstrated a solid dedication to achieving broader socioeconomic objectives (David, 2009). The ONE Community initiative by Liverpool ONE intends to have a beneficial influence on the sustainability, well-being, and prosperity of the Liverpool city region (Daramola-Martin, 2009; David, 2009). Both cities highly emphasise sustainability and the adoption of cutting-edge urban development ideas.

To enhance comprehensive data collection, both cities were divided into distinct areas for easy referencing and data were systematically collected within each block of the retail sections in public spaces, adhering to parameters of about 8.32 meters in length

and 10.97 meters in breadth for each location (Government, 2015). To ensure consistency, it was suggested that each study section should be measured at roughly 9.14 meters, with any region beyond this length being treated as a separate section. This method enabled effective management and data monitoring within small, targeted environments, accommodating differences in dimensions and facilities across the study areas.

MANCHESTER	LIVERPOOL
Exchange Square	Liverpool One
Market Street	Primark, M&S Church St.
St Ann's Square	Williamson Square (<i>Richmond St, Houghton St</i>) Clayton Square and St Johns (<i>Elliot St, Parker St</i>)

Table 3-5: Display the case study sites for observation of this research study.

a. MANCHESTER

The figure below illustrates a map of the Manchester case study, the retail areas where primary research was conducted, and explains each area.

Manchester

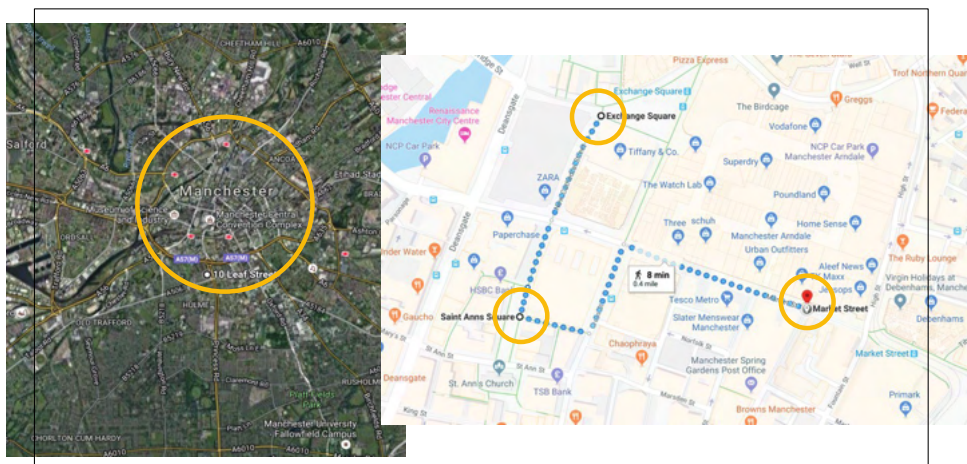


Figure 3-3: The specific sections of Manchester city sites (Source: Google Maps).

Exchanges Squares, situated between Victoria Train Station and the Printworks, attracts locals and tourists with its seasonal activities and trendy boutiques. According to Carter (2013), the square exemplifies urban regeneration with its unique architecture, spending habits, and demographics, designed to be vibrant and pedestrian-friendly. The city sought innovative, practical solutions that would benefit local people economically and socially. Although this place was redeveloped after the 1996 bombing to enhance the vitality and competitiveness of the core (Williams, 2000), the area still faces extremes of poverty, unemployment, and other forms of social exclusion, despite economic growth, and Exchange Square's role in the city's progress remains uncertain (Carter, 2013; Harding et al., 2010).



Figure 3-4: Exchange Square in Manchester features contemporary urban architecture and popular retail and gathering spaces. Although seating is plentiful, it can be uncomfortable and inconvenient.

Market Street, the main commercial centre of Manchester, boasts a lively pedestrian area that attracts tourists with its prominent stores and the famous Manchester Arndale Centre, one of the largest shopping malls in the UK, which attracts an impressive 41 million visitors each year (Manchester City Council, 2018). As the primary thoroughfare linking Piccadilly Station and Victoria Station, this street experiences a continuous influx of individuals, with weekend footfall averaging over 200,000. According to Carter (2013), the city's transition was further complicated by technological advancements and the emergence of the 'information society', resulting in a combination of economic prosperity and ongoing issues of poverty and unemployment. Urban planners and politicians encountered intricate and multifaceted issues. Manchester responded by initiating urban renewal initiatives to enhance its digital infrastructure and foster a knowledge-based economy. Today, Market Street reflects Manchester's ongoing urban transformation.



Figure 3-5: Manchester's Market Street retail core is known for its high-street stores, busy pedestrian areas, benches, and trees that enhance the urban environment. However, heavy foot traffic reduces visibility.

St Ann's Square, a lively centre for commerce and culture, celebrates Manchester's wealthy heritage. It provides a more peaceful alternative to shopping in the city centre (Williams, 2000). After the region's economic decline, small cultural businesses and artists moved in due to affordable property, helping to shape the area's unique character since the 1970s. This cultural infusion has given the square a distinctive atmosphere, contrasting with the city's entrepreneurial and corporate expansion (Manchester City Council, 2018). St. Ann's Square features comfortable benches, attractive planting, and pedestrian walkways, all enhancing accessibility and welcoming both locals and visitors. Numerous shops, cafés, and restaurants nearby offer plenty of options for dining and shopping. The square frequently hosts cultural events and concerts, adding to its lively energy. This blend of history, modern amenities, and cultural vitality makes St. Ann's Square a cherished Manchester landmark (Carter, 2013; Manchester City Council, 2018).

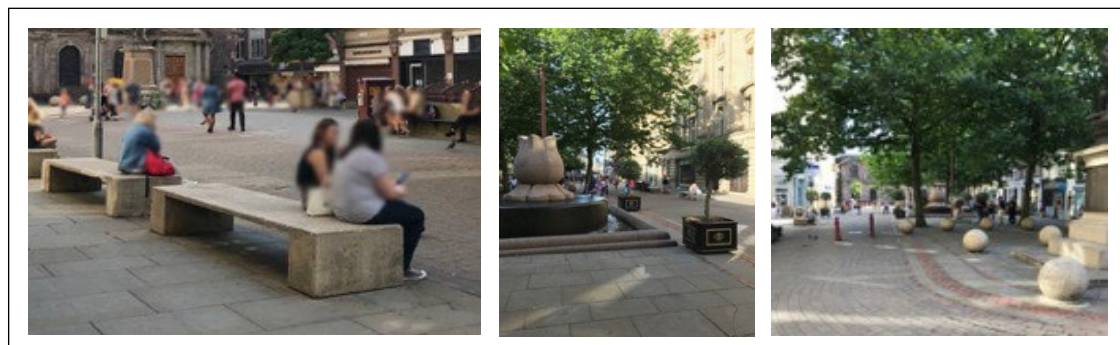


Figure 3-6: St Ann's Square in Manchester offers green spaces, stone benches, and boutiques, creating a welcoming atmosphere for relaxation and shopping. However, the benches may be uncomfortable and less accessible.

b. *LIVERPOOL*

Below is a map illustrating the Liverpool case study and the corresponding retail areas where primary research took place, accompanied by an explanation of each area.

Liverpool

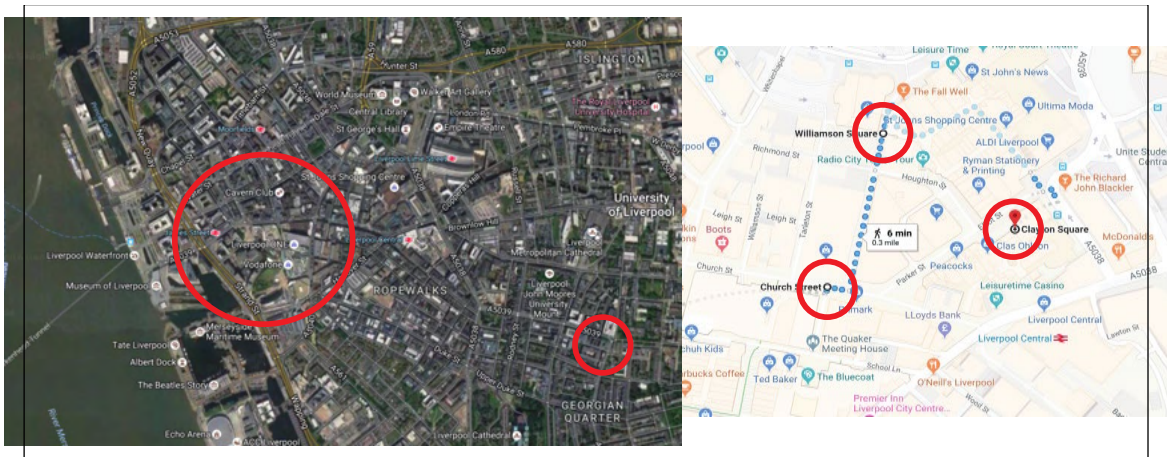


Figure 3-7: Illustrates the specific sections of the sites in Liverpool city.

Liverpool One of the largest open-air retail centres in the United Kingdom and ranked as the fifth most extensive overall, stands out for its unique feature of having each store created by different architects (Toop, 2020). This expansion has greatly enhanced the local economy and propelled Liverpool to one of the top five most sought-after shopping locations. The intricate structure includes expansive pedestrian pathways, abundant seating, and diverse retail and dining choices (Dmochowski, 2016). This area is highly regarded for its well-designed arrangement, which attracts many users. Liverpool One offers many activities, including shopping and other leisure pursuits, and provides a comfortable environment for guests to rest and unwind (Toop, 2020). Nevertheless, it has faced criticism for favouring retail and leisure activities at the expense of more comprehensive public functions (Daramola-Martin, 2009).



Figure 3-8: Liverpool ONE is a vibrant shopping and leisure area with outdoor seating and green spaces, encouraging relaxation and socialising, though seating can be crowded.

Church Street, now serving as Liverpool's primary retail district, is situated between Bold Street to the East and Lord Street to the West. The southern section of Church Street is seamlessly incorporated into the Liverpool One shopping complex (Dmochowski, 2016). The area retains the conventional ambience of a prominent shopping street, showcasing a blend of privately owned stores, street sellers, and impressive architectural elements (Jones et al., 2016). The neighbourhood is highly esteemed for preserving historical and cultural components and promoting a lively street atmosphere with local merchants and sellers. In addition, several areas have been transformed into residential and recreational developments, covering a significant portion of the L1 postcode region (Liverpool City Authority, 2017). Although there are positive aspects, the correlation between expensive rents and gentrification has been associated with the displacement of local companies and communities (Daramola-Martin, 2009).

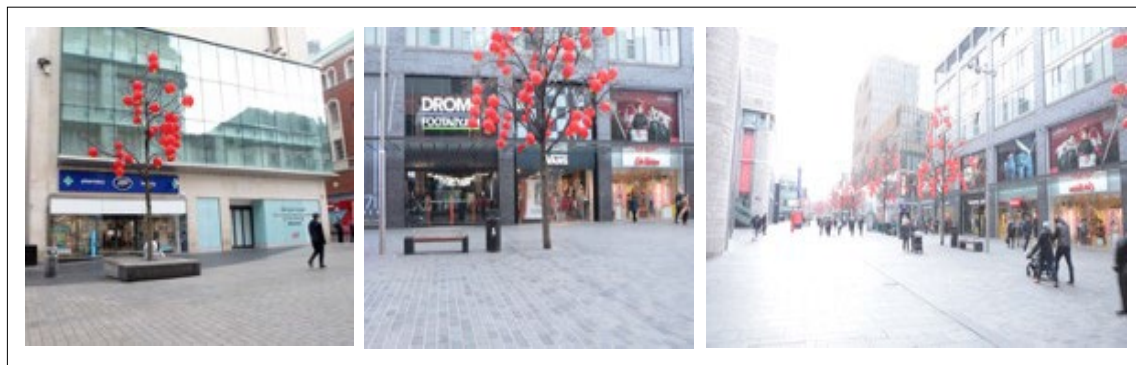


Figure 3-9: Church Street in Liverpool offers modern retail facades and artistic tree installations, creating an attractive shopping atmosphere, though seating remains limited and often uncomfortable during peak hours.

Clayton Square Shopping Centre is a centrally located mall close to Liverpool Lime Street and Liverpool Central railway stations. It ranks as Liverpool's fourth-largest retail mall, trailing behind Liverpool One, St. Thomas's Retail Centre, and Metquarter Shopping Centre (Liverpool City Authority, 2017). Although once renowned among the local populace, it continues to efficiently cater to its consumers. Clayton Square is a condensed public area serving as the city's key centre. It accommodates a lively market and offers a venue for community activities and meetings (Daramola-Martin, 2009). The architecture and programming of Clayton Square appeal to a wide range of consumers and promote social interaction. Nevertheless, there are concerns exist that the area may be perceived as exclusive or controlled by specific groups, which could limit its accessibility and social influence (Carmona, 2019; Dmochowski, 2016).

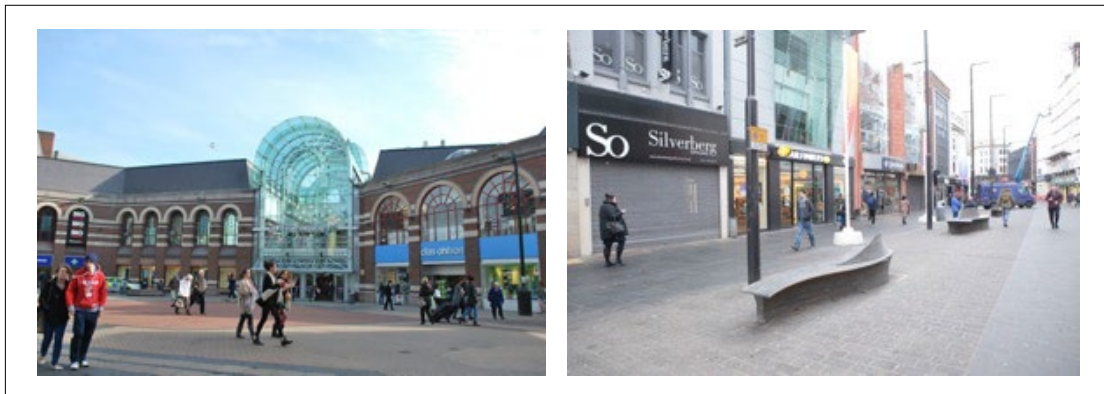


Figure 3-10: Clayton Square offers modern retail settings but provides limited and uncomfortable seating, restricting longer use.

Williamson Square features fountains with 20 water jets that reach four metres high. These fountains are illuminated with coloured lights in the evening. The square is celebrated for its cultural and artistic offerings, such as the Playhouse Theatre and public art installations. It acts as a venue for various events, street performances, festivals, and acts, drawing a diverse crowd (Layton-Jones & Lee, 2008; Liverpool City Authority, 2017). Although its character enhances its appeal, concerns exist regarding inclusivity and accessibility. The programming and design of the square may inadvertently favour certain demographic groups while neglecting the needs of underrepresented or marginalised individuals (Dmochowski, 2016; Daramola-Martin, 2009). Significant improvements in programming and architecture are necessary to ensure it adequately serves the entire community (Carmona, 2019).



Figure 3-11: Williamson Square features generous seating and open space, yet lacks cultural or historical features to enhance the experience.

An analysis of the urban environments in Manchester and Liverpool uncovers unique features and challenges in both cities. The case studies conducted in these locations combine historical aspects with contemporary design, offering valuable insights into the impact of street seating on social interaction and community participation. Although these areas generally encourage public use, there is potential to incorporate more features, such as local heritage elements, to enhance social interaction, convenience, and accessibility in urban settings. By focusing on street seating in the shopping areas of northwest UK city centres, this investigation aims to provide exemplary examples and share the insightful findings of this ongoing research.

3.5.2 Selection of Street Seating in Public Spaces

This research investigated 15 different seating types, with the Manchester case study featuring six types and the Liverpool case study showcasing nine. The selection of street seating was underpinned by five key factors, elaborated upon in the following paragraphs.

First, Gehl (2004) investigated public space dynamics and the impact of street furniture on community participation and functionality. Gehl's findings demonstrated that

thoughtfully designed street furniture can foster socialisation and accessibility and create welcoming spaces. This highlights the expanding importance of street furniture in public settings, emphasising its role in community participation and urban enrichment. Therefore, seating types that encourage social interaction and accessibility were prioritised. **Second**, Siu & Wong (2015) underscore a gap in public design research, noting that studies often neglect microelements, particularly those related to street furniture. Similarly, Han et al. (2022) argue for the critical role of microelements, including street furniture, in shaping people's behaviour in public spaces. This consensus highlights the importance of further exploring the micro aspects of street furniture. Thus, seating types that address these overlooked microelements were carefully selected to fill this research gap. **Third**, the influential role of design in shaping human behaviour is widely acknowledged (Niedderer et al., 2014). Gehl (1989), supports this by noting that street furniture reflects human activities and behaviour in public spaces. Therefore, seating designs that have a significant impact on human behaviour and interaction were chosen. **Fourth**, Whyte (1980), emphasises the essential role of sitting as a readily accessible element, stating that people prefer to sit where seating is available. Comfort, even in unconventional sitting spots, influences behaviour. As a result, the selection included comfortable and accessible seating options to encourage use and engagement. **Fifth**, designers are crucial in considering end-users' needs and preferences Siu & Wong (2015). However, Rehan (2013a) notes the visual impact of street furniture on a city's image, emphasising the need for correct and sustainable design to influence a city's global positioning positively. Consequently, the seating types chosen were those that not only met users' needs but also contributed positively to the city's aesthetic and sustainability goals. Therefore, the author strategically chose street seating as the focal point of this research, highlighting the designer's imperative to grasp the original culture of a place, a principle echoed by Asep Ahadiat Gandawijaya et al. (2021). This underscores the critical role of cultural awareness in practical design, emphasising the necessity for collaboration among all stakeholders to achieve well-balanced environments that harmonise seamlessly with both environmental elements and human inhabitants.

3.6 Section: Ethical Application

Ethical considerations and arrangements before collecting data are vital, and this research is not exceptional in applying the procedure. The ethical clearance was obtained from the Research Ethics Committee, Lancaster University, through the Lancaster Institute of Contemporary Arts (LICA). The requirement of the University's Code of Practice required all the researchers to follow before carrying out the data collection process. Approval was granted before the field research was conducted (see Appendix). Including ethical considerations and necessary preparations before data collection is crucial, and this research strictly followed established protocols.

3.6.1 Observational

Observation systematically examines individuals engaged in activities, events, or interactions with products or services. The observation in this research study involved gathering data on the date, time, weather conditions, and overall atmosphere. Significant events throughout the observation period were also documented, and the data collection period spanned from 10 am to 6 pm OR 10 am to 9 pm, including both weekdays and weekends, to incorporate a wide range of individuals, activities, and street seating scenarios for the research. In addition, three additional hours were added following the closing of the retail business hours.

The observation period in March was deliberately chosen to encompass various activities and interactions occurring in the retail spaces. March represents a transitional period from winter to spring, providing a unique opportunity to observe how changing weather conditions affect the usage of outdoor seating and public areas (Kendon et al., 2022). This period typically includes a mix of colder days, warmer days, and sunny days, which allows for a comprehensive understanding of how different weather conditions impact public behaviour and the utilisation of street seating (Sun et al., 2024).

The researcher employed a walk-by observation technique (Mehta, 2014) to examine the retail areas included in the study. By strolling past each completed section, the researcher focused on integrating the sustainable principles of Elkington's Triple Bottom

Line (TBL) framework with Mehta's dimensions of sociable streets—Social Aspects, Physical Aspects, and Behavioural Aspects (Elkington, 2001; Mehta, 2013). The dimensions encompassed various elements, including social aspects like physical space or the environment, behavioural aspects like people or users, and physical aspects of street furniture products, particularly street seating (Mehta, 2013, 2014). This comprehensive approach allows for evaluating urban product settings' environmental, economic, and social sustainability. At the same time, the current street seating design of both case study sites was audited using thematic framework design approaches and specifications derived from past studies by various scholars (see Chapter 2). Further details are included in each approach.

3.6.2 The protocol – Walk-by Observation

This task involved two types of observations: product observation (auditing) and space and people observation (behavioural mapping). Each aspect observed is explained below:

- a) **Product observation:** This aspect encompasses two essential tasks. Initially, the researcher thoroughly examined all outdoor seating areas in the Manchester and Liverpool case study locations. The audit evaluated each category of street seating based on the thematic frameworks of design approaches and specifications for street seating design (see p. 95 – 107). This approach helps to establish a correlation between the choice of product specifications and sustainable materials and how they influence social interactions and usage patterns in public spaces. The scale of the audit varies according to the design approaches and specifications. The figure below depicts the audit's observation card scores, encompassing information such as the city, section area, and various seating kinds. The audit occurred in May 2018, with temperatures ranging from 13°C to 25°C. These particulars are documented for analysis. In addition, the researcher recorded any extra characteristics of the street sitting, which were classified into two categories: 'Micro' and 'Macro' product features, as indicated in the table below.

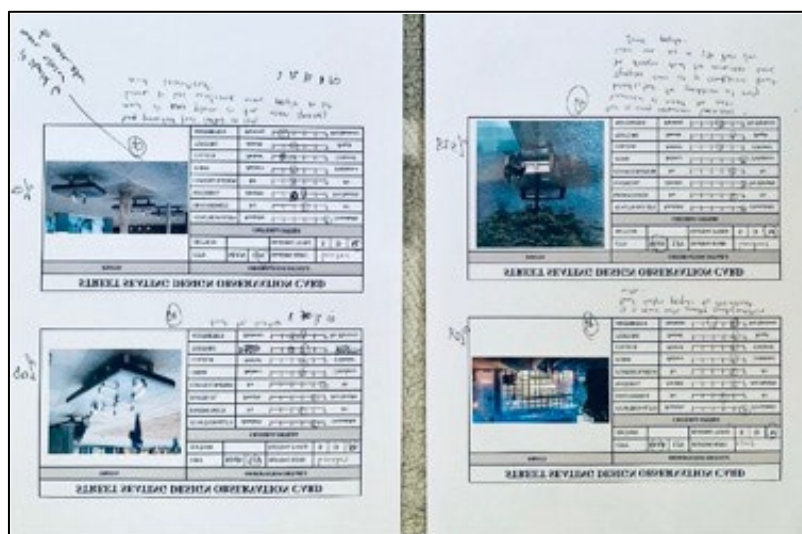


Figure 3-12: Illustrates the card scores used for the audit records

MICRO PRODUCT FEATURES	MACRO PRODUCT FEATURES
Plug Point	Design e.g. Groove, Hole
USB Point	Armrest / Backrest
Small Trash	Stroller Parking
Cup/ Bottle Holder	Working Spaces

Table 3-6: Displays the two distinct groups of exemplary product features.

- b) **Space and people observation:** The second walk-by observation aimed to observe the Space and the People. The research employed behavioural mapping to collect all necessary data. Behavioural mapping is a method used to record human activity in specific locations through maps, plans, videos, or time-lapse photography. It documents people's movements, activities, ages, genders, whether they are alone or with others, their actions, the duration spent in areas, and the environmental context (Martin & Hanington, 2019). In the current study, behavioural mapping involves using a transparency paper that thoroughly examines activities or behaviours throughout the 60-minute observation period. Coloured stickers represent each observed activity or behaviour, with each sticker corresponding to a 2-minute interval, allowing one set to cover the entire 60-minute observation.

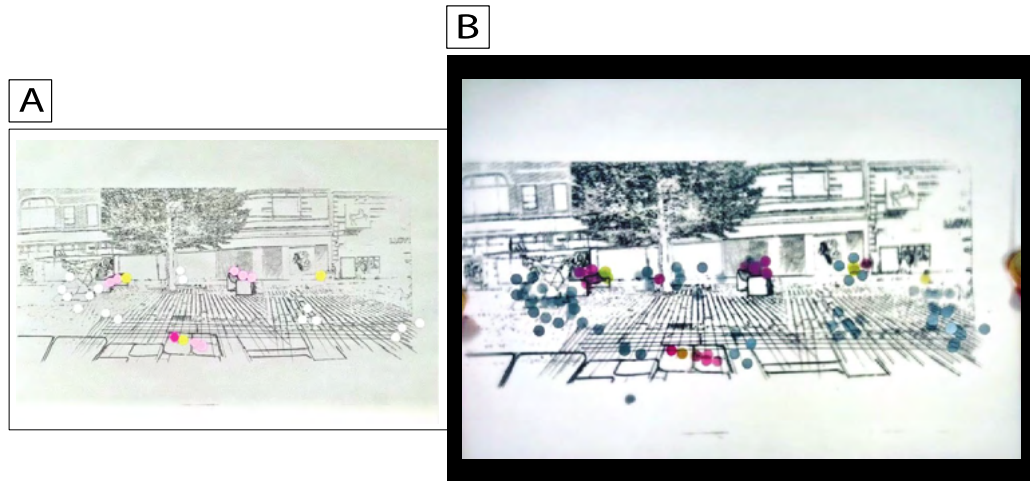


Figure 3-13 Photo A exemplifies a single piece of behavioural mapping, while Photo B illustrates a complete set of 30 behavioural mapping pieces..

3.6.3 Advantages and Disadvantages of Mapping Methods

Researcher commonly uses two types of behavioural mapping to observe or study behaviour (Martin & Hanington, 2019; Zeisel, 1984).

i. Place-centred Mapping

Place-centred mapping has several advantages, such as providing spatial insights by elucidating the impact of specific places and characteristics on behaviour and interactions. Researchers can use it to combine data from several observations to uncover general patterns and concentrations of activity. This approach is less invasive as it does not track individuals, hence minimising the requirement for consent. Its versatility makes it valuable for examining diverse environments such as retail establishments, parks, and public areas. Nevertheless, it possesses several drawbacks, providing only a surface-level understanding and not capturing the motivations or reasons behind observed behaviours. The behaviour intention remains to be discovered by the observer.

ii. Individual-centred Mapping

Individual-centred mapping provides comprehensive behavioural insights by monitoring and analysing individual behaviours and interactions over an

extended period. It offers customised data, uncovering intricate details about social behaviours and personal relationships. However, this approach would be better if enhanced with additional interviews or debriefing sessions to get insights into individuals' motives. Nevertheless, it is more invasive, necessitating participants' consent and perhaps influencing their natural behaviour. This action could also be biased data, whereby participants may exhibit altered behaviour due to being under observation. This approach is further intricate and requires significant resources, as it entails monitoring a single or small number of individuals throughout different periods and locations.

3.6.4 Choosing Place-centred Behavioural Mapping

Place-centred behavioural mapping is more convenient because it is straightforward, as it focuses on a specific area rather than monitoring individuals. Participant permission is usually optional, which simplifies the study process. Without hesitation, this research employed a highly versatile strategy that can be used in various settings, including retail and public venues. Furthermore, it allows gathering data from multiple observations to identify general trends and patterns without needing further interaction with people, thus improving efficiency and reducing intrusiveness (Martin & Hanington, 2019).

3.6.5 Systematically documented using Behavioural Mapping

i. Recording Environmental Details

Initially, important environmental factors such as the day, date, time, location, weather, and atmosphere were carefully recorded, with particular attention to the spatial aspect. The March observation period was notable because it marked the change from winter to spring. This period allowed for collecting diverse data under different weather conditions, including cooler, warmer, and sunny days typical of this seasonal shift (Kendon et al., 2022). Weather variability is crucial for understanding how environmental factors influence user activities and behaviour (Sun et al., 2024). Additionally, any significant events that deviated from a typical day were documented on the behavioural map, as they could affect

user actions or behaviour. This extensive environmental data provides a solid basis for accurately analysing behavioural patterns and assessing how external factors influence the use of public spaces.

ii. Recording Active Behaviours through Behavioural Mapping

During each 60-minute observation at every segment of the case study locations, the researcher recorded the behaviours of individuals utilising the public open spaces, which were carefully marked on the map. Systematically, coloured stickers were attached to represent different activities or behaviours of the individuals, at a rate of one sticker every two minutes. The data collection involved noting various body positions, such as sitting, lying down, standing, or sleeping, and categorising individuals based on apparent age and group involvement. These activities and preferences are outlined in the adjacent table. This thorough approach ensures a detailed understanding of both the physical environment and the actions of people within it, providing valuable insights for the research.

Symbols	Description
<i>Std</i>	Standing
<i>St</i>	Sitting
<i>Ly</i>	Lying
<i>E</i>	Eating
<i>D</i>	Drinking
<i>Re</i>	Reading
<i>Sm</i>	Smoking
<i>Ct</i>	Chatting
<i>Cd</i>	Cuddling
<i>Lo</i>	Loitering
<i>WL</i>	Working on laptop
<i>Rt</i>	Resting after shopping
<i>Pl</i>	Playing
<i>WP</i>	Walking Pets
<i>P</i>	Performing

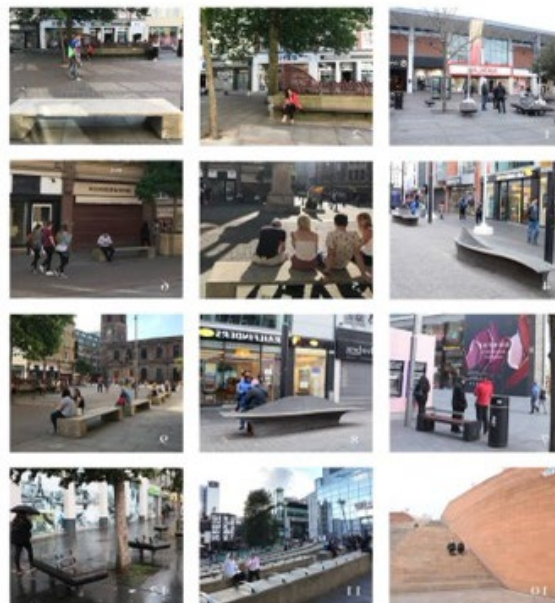


Table 3-7: Describe the symbols and description of various active behaviours for social sustainability as observed during the fieldwork portrayed next to

Spaces: The examined areas comprised parts of the site that were 9.14 meters in size and were marked out using Google Maps. During this task, the researcher carefully analysed the seating design, configuration, and general site layout, documenting other street furniture features such as trash bins, shade, and tables. This thorough observation aimed to get insights into the architectural characteristics of street sitting and evaluate how often people use the available area. The assessment was guided by the vital question:

- a) *"Are the seating elements close to each other?"*
- b) *"What is the duration of individual occupancy at the location?"*
- c) *"In what space-related activities are they involved?"*
- d) *"What is their reaction to the atmosphere?"*
- e) *"What is the duration of their sitting, standing, or chatting?"*

These questions are relevant to the space and people sections since they assist in documenting the physical layout and usage of the place and the behaviours and activities of persons inside that area. The main goal of this approach is to record data regarding people's actions when utilising street sitting at the selected research locations, particularly their interactions with the product and their use of the surrounding areas.

People: This research focused on observing and recording user routines and timing to understand the practicality of different street seating types and identify optimal layouts and configurations that benefit users and the surrounding environment. Additionally, the study explored average applicable sizing based on the types of users engaging in social activities. It also aimed to identify factors that encourage individuals to initiate conversations with strangers seated nearby. This comprehensive approach provides valuable insights into user behaviour and social interactions facilitated by street seating.

3.6.6 Surveys

The observation approach provided valuable insights into human behaviour in public spaces and on the streets, answering questions concerning "what," "when," "where," "who," "with whom," and "how." In addition to these observations, the researcher conducted surveys to investigate persons' social preferences, feelings, opinions, and attitudes towards street seating, street furniture uniformity, and the environment.

A survey is a systematic inquiry technique employed to gather data from a predetermined cohort of participants to obtain information and discernment on diverse subjects of significance (Martin & Hanington, 2019). Check & Schutt (2012), as referenced in Ponto (2015), define a survey as gathering information from a selected group of persons by eliciting their replies to a series of questions. Surveys are designed to collect self-reported information on individuals' characteristics, feelings, thoughts, behaviours, or attitudes (Martin & Hanington, 2019). This aligns effectively with the study objective of comprehending how users engage with street sitting in urban spaces.

This approach strategically enhances the current study by facilitating prompt responses while minimising potential bias. Additionally, the researchers claimed that this methodology is more genuine because it considers how participants respond to their immediate surroundings, producing more accurate and pertinent data for the study (Robson & McCartan, 2016).

The surveys were conducted from May 2018 to August 2018. The researcher obtained responses from approximately 190 participants, 100 of whom were based in Manchester and 90 in Liverpool. Although surveys may be conducted in other formats, such as questionnaires and interviews, this study used in-person surveys to obtain more authentic results directly at the location. Hardcopy questionnaires were distributed (see Appendix) and were sent to participants, and the survey schedule was as follows:

Time Frame	Task
May 2018	Questionnaires were initially distributed in Manchester and Liverpool.
From June to July 2018	The researcher continued distributing and collecting surveys in both cities, ensuring diverse participants.
August 2018	The survey results were gathered and collated in August 2018. There were around 190 participants, 100 of whom were from Manchester and 90 from Liverpool.

Table 3-8: This timetable facilitated comprehensive data collection and ensured that replies were obtained promptly and effectively, resulting in a robust dataset for the research.

The survey consisted of twelve questions that covered both objective and subjective aspects. These questions included ranking priorities and addressing Burke's (1945) five questions about an action: 'what was done (act), when and where it was done (scene), who did it (agent), how they did it (agency), and why they did it (purpose)' (cited in Mehta, 2013, p.81). This survey aimed to gather comprehensive data on participants' preferences, knowledge of their surroundings, opinions on street furniture, and ideas for urban public spaces that support active social behaviour.

The questions examined several elements, including the time of day, surrounding surroundings, street benches, neighbouring street furniture, and measures for promoting social behaviour. Participants were directed to evaluate and prioritise several forms of street sitting and suggest improvements to promote social engagement in public spaces (Martin & Hanington, 2019). The incorporation of questions regarding social behaviour sought to collect practical suggestions from participants on how street seating and furniture design may improve social interactions. This is consistent with the notion that urban design may enhance community engagement and vibrant social interaction, providing valuable insights for improving the layout of public areas. Eventually, the survey data are compared with the walk-by observations and audit data to analyse the synchronisation, and the analysis will serve as input for the following expert interview session.



Figure 3-14: Scenario during the survey with random participants on site.

**Consent given verbally during the time the photo was taken*

3.6.7 Interview

The interview method for this research followed a semi-structured approach that included structured and open-ended questions. This approach enables experts to receive guidance while still allowing them to articulate their perspectives, fostering open and informative communication between the researcher and respondents (Martin & Hanington, 2019). According to Bryman & Teevan (2005) and Neuman (2007), interviews are an effective means of gaining insight into phenomena that may be challenging to understand using alternative methods (as cited in Mann, 2011). Obtaining interview data is crucial for grasping current scenarios concerning street seating design and exploring the insights, views, and opinions of industry experts or critical figures.

This approach was selected based on its ability to capture intricate and nuanced viewpoints, enhancing the comprehensiveness of the acquired observational and survey data. The research was enhanced by directly involving specialists who have firsthand knowledge and practical insights in the field. These inputs are crucial for producing street seating designs that promote social sustainability in urban public areas.

Therefore, Rubin & Rubin (1995, as cited in Yin, 2003) assert that in case study research, a smooth and uninterrupted progression of information is more important than

a strict and rigid organisational framework. The flow of the discussion ensures that it stays current and intelligent, adapting to the dynamic nature of human contact and the intricacy of urban design subjects. This fits the current research context, where it is vital to have experts as the participants in the interview, as they have in-depth knowledge and experience.

Notably, within the framework of this study, the semi-structured interviews served as a medium for professionals, including designers, planners, council members, architects, and urban planners, to exchange their extensive expertise and experiences about the design and execution of street furniture in public areas. The insights provided by these professionals, including validating the surveys and audit findings, were essential for comprehending the practical obstacles and inventive approaches involved in designing sustainable and user-friendly public seating. Furthermore, the adaptability of the semi-structured interview style facilitated the investigation of several subjects pertinent to the research, including:

- i. **Design Considerations:** Experts can provide detailed insights into the various design features that either improve or impede the functioning and aesthetics of street seating.
- ii. **Sustainability Practices:** Conversations on using sustainable materials and methodologies to create and maintain street seating showcased tangible instances of how environmental factors are included in urban design.
- iii. **User Interaction:** The study aimed to encourage active social behaviour in public places through well-designed street seating. To this end, insights were collected on how designs affect user behaviour and social interactions.
- iv. **Policy and Implementation:** Professionals discussed their firsthand experiences with policy frameworks and implementation tactics that either facilitate or hinder the progress of street seating initiatives.

Overall, involving experts in the interview process enhances the research by incorporating a range of professional viewpoints, guaranteeing that the study's findings are solid and relevant to practical urban planning and street seating initiatives. Nevertheless, possible disadvantages encompass the likelihood of biases stemming from the subjective viewpoints of experts and the difficulty of synchronising schedules with

busy professionals. In addition, experts may hold opposing opinions that limit the process of reaching a unifying evaluation. However, for this research, the expert opinions were measured or evaluated based on specific criteria or indicators chosen to ensure a structured and consistent assessment. Hence, the criteria for selecting experts are vital in the early stage.

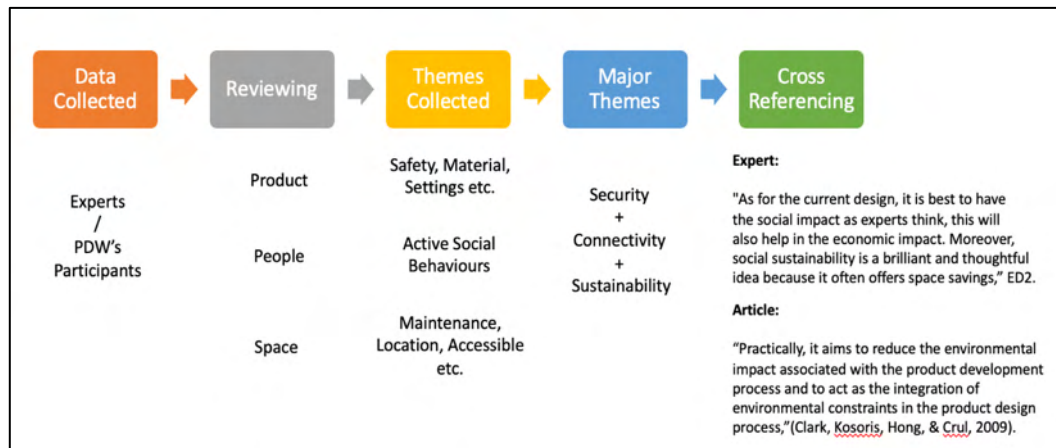


Figure 3-15: Sample of the thematic coding process conducted in this study. Themes are developed through familiarisation with the data or by grouping codes into potential themes.

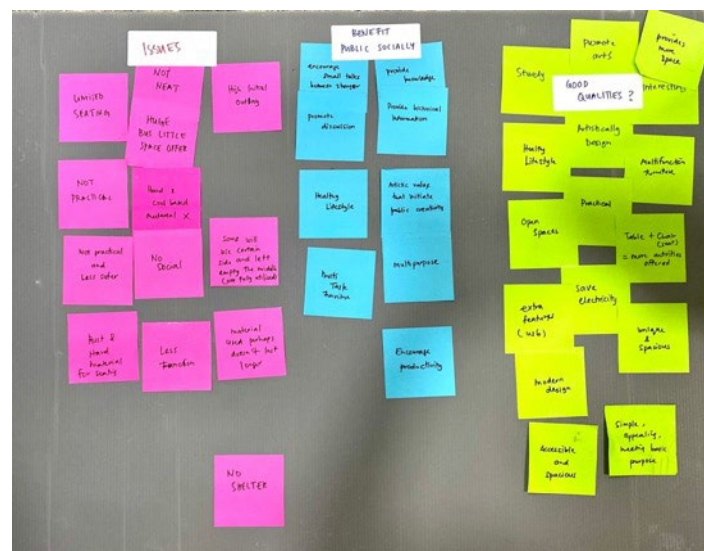


Figure 3-16: Example of the categorisation stage of the themes identified in the quick presentation transcripts, organised into three categories, with potential for further development of the themes.

Recruiting Experts

- Following predetermined criteria, the researcher successfully identified and recruited experts from organisations or companies that specialise in street furniture design, urban planning, and urban design.
- Invitations were issued via electronic mail, and once accepted, interviews were arranged by telephone, online, or in-person consultations, depending on the expert's preference. During the interview session, experts were provided with a Participant Information Sheet (PIS) and a consent form, both of which they duly signed and subsequently returned via email, postal service, or in person.

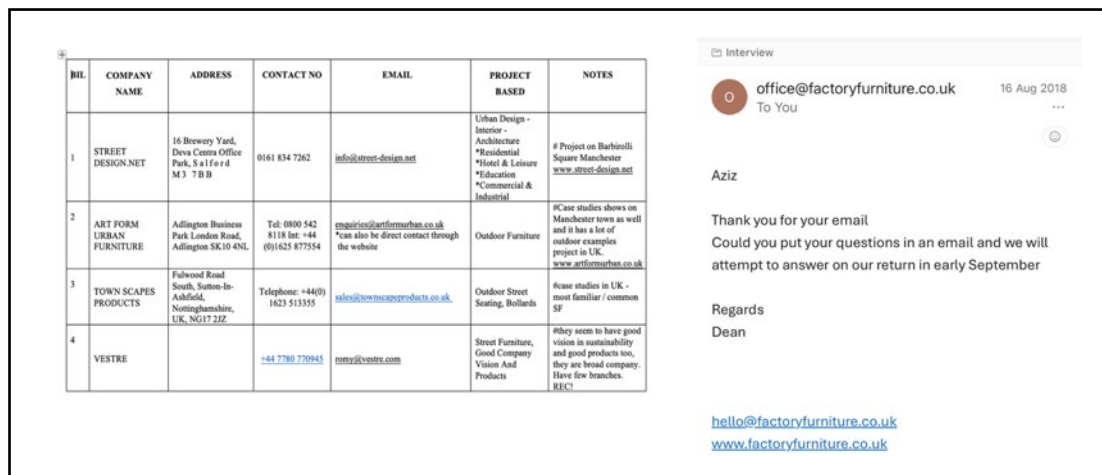


Figure 3-17: Sample documents illustrating the expert recruitment process via email and follow-up confirmation.

COMPANY	ROLE / CODE	AGE / GENDER	YEAR OF EXPERIENCES	WORKING SCOPE
Vestre, UK	Head Designer ED1	47 / M	>15years	Urban Sustainable Design
Publica, UK	Head Designer ED2	41 / F	>15years	Outdoor: London City Urban Design
Euroform, Italy	Director ED3	38 / M	>10years	Architecture / Landscaping / Interior

Table 3-9 Expert's Panel Characteristics

Time Management

- Considering the time limitations of consulting specialists, the PIS explicitly stated that the interview must be at least one hour.
- The interview followed a semi-structured format, which balanced prepared questions to maintain focus on the relevant topics with the flexibility to explore emerging themes and insights.
- Notwithstanding its limitations, such as the potential lack of richness and in-depth data, this structure was selected because it was suitable for collecting precise information from authorities with an expert understanding of the research objectives.

Semi-structured Interviews

- The interview was divided into two segments: Part A inquired about the expert's personal information, whereas Part B addressed research-related questions (refer to Appendix).
- Implementing a semi-structured format facilitated the addition of supplementary questions in response to the respondents' answers, enhancing the inquiry's depth while ensuring its relevance.

Measuring and Documenting

- The completed interview session was recorded to preserve the conversation's natural tempo and precise details.
- Ensuring the accuracy and completeness of the interview data through recording was deemed essential, as well as following best practices for qualitative interviews.
- The data were archived for subsequent analysis following the interviews, providing opportunities for experts to be consulted for clarification or verification.

Adhering to methodological rigour, ethical considerations, and time constraints, the structured interview process ensured the collection of exhaustive data, which was then analysed to derive meaningful insights.

3.6.8 Participatory Design Workshop (PDW)

Participatory Design Workshop (PDW) is a human-centred approach advocating active user and expert engagement throughout all phases of the research and design process, including co-design activities. This engagement often leads to creativity and innovation, as participants provide unique insights that designers might have yet to consider independently (Martin & Hanington, 2019).

In this research, the final method employed was a participatory design workshop (PDW), described as an informal discussion focused on a set of issues, similar to a focus group as per Silverman (2004:177); however, unlike focus groups, which involve the same group of participants and are often used by market researchers to gauge general opinions, PDWs involve diverse experts to gather more specific and varied insights.

The primary motivation for using PDW methodologies in this study is their alignment with a human-centred approach, underscoring the significance of engaging users and experts in research and design procedures. PDWs are vital for developing practical practice by actively including users and professionals (Silverman, 2004). This engagement helps gather a thorough grasp of their experiences and requirements. They facilitate cooperation between professionals and consumers, creating more expansive and rigorous crucial factors. According to Martin and Hanington (2019), techniques such as user comprehension and preference surveys ensure contextual significance and help understand the surroundings in which the design will be executed.

Participating in PDWs offers several benefits by ensuring active involvement of users and experts, with the design focusing on users and meeting their specific needs and preferences. These workshops utilise various creative discussions, including composition, exemplary images for atmosphere studies, flexible ideation of sketching with the community for better insights, which lead to the development of innovative

practices. By valuing and honouring participants' imaginative ideas, PDWs can stimulate and guide the design process, leading to more innovative and effective design outcomes. Incorporating participant input and design knowledge enables the development of well-informed design criteria, services, and artefacts, ultimately enhancing the quality of design outputs.

Nevertheless, the current study acknowledges that PDWs possess certain drawbacks. Organising and implementing PDWs can be challenging, requiring substantial involvement from users and experts at every stage of the design life (Martin & Hanington, 2019). Additionally, organising and implementing PDWs require significant resources, including time, costs, and workforce. Conflicts may arise due to divergent interests and viewpoints among experts, complicating the decision-making process (Robson & McCartan, 2016).

On the other hand, Bryman (2008) argue that focus groups are also a versatile method that enables participants to engage in discussions and debates on a specific topic, providing the researcher with a more transparent and authentic understanding of the topics being explored. However, focus groups may not be the most efficient approach for this research due to resource limitations and participants' tendency to express more generalised opinions. This research aims to gain insights from user and expert opinions on crucial factors and reduce the impact of dominant individuals and groupthink. Including experts provides the added benefit of specialised knowledge and professional perspectives, which can enhance the quality of the final findings and ensure that the design considerations are both practical and innovative (Susan et al., 1993).

Recruiting Participants, Including Experts

- For the present research, participation in the PDW was contingent upon knowledge or experience in design, especially in street furniture design, understanding of the design lifecycle, and familiarity with the needs and preferences of urban public space users. For experts, this included professional expertise in urban design, architecture, landscape architecture, or related fields, with a specific focus on street furniture and public space design.

- As for the participants from the everyday users, this encompassed practical Experience and daily interaction with urban public spaces provide valuable insights into user needs, behaviours, and preferences. Folch-Lyon and Trost (1981, p. 443) assert that this technique is essential for understanding the psychological and behavioural foundations of consumer behaviour and for identifying ways to influence it. Participation was voluntary, with participants responding to a pamphlet on the Lancaster Facebook page and snowballing from friends to friends and from those in the design school. Participants needed to be adults aged 18 or older and to have resided in the UK for at least one year, whether for study or work. The participant selection followed 'purposive' or 'convenience' sampling, aligning with Susan et al. (1993), who chose community members believed to provide the most relevant information. Folch-Lyon and Trost (1981) added that participants are selected from specific target groups whose opinions and ideas are particularly relevant to the investigation (1981, p. 444).

The PDW's activities

Prospective participants were required to complete the form and submit it on the day of the PDW before the session began. The PDW encompassed four tasks: 1) 'Open Discussion and Post-Notes', 2) 'Quick Sharing Presentation', 3) 'Seating Configuration,' and 4) 'Sketching.' All materials needed, including name stickers, note stickers, emoticon stickers, pens, A4 paper, and others, were provided on the day of the PDW.

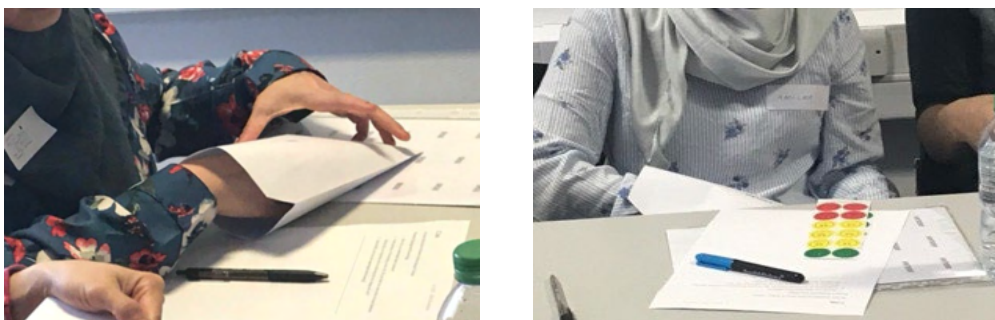







Figure 3-18 The envelope that contained all the tools used in PDW, as shown in the next figure.

The following table provides a detailed explanation of the procedures and steps involved in conducting the Participatory Design Workshop (PDW):

Task	Duration (Minutes)	Materials	Description
Obtaining Consent	2	Consent Form	Participants sign the consent form as a prerequisite before the commencement of the PDW session.
Ice Breaking	10	Sticker for name tag	Participants share personal details, including name, age, occupation, marital status, and duration of UK residence.
Welcoming Speech by the Author	5	Script and Visual	The study emphasizes the importance of the focus group (PDW) and expresses gratitude to participants. Their diverse backgrounds, experiences, and knowledge provide unique insights into social behaviour, preferences, and street furniture design. Participants' marital statuses and ages enrich the study, providing a comprehensive understanding. The interactive session with users and designers helps gather data, explore diverse perspectives, and improve study results.
1A: Open Discussion	10	Question Sheet Paper and Stationery	<p>This open discussion explores street furniture ideas using participants' and designers' perspectives. Participants discussed street furniture in an open conversation and wrote their comments:-</p> <ul style="list-style-type: none"> • Understanding Street Furniture: Participants explain their street furniture interpretations, focusing on street seating. • Development of Cities through Street Furniture Design: Discuss how inventive street furniture design affects a developing city and shapes its identity. <p>This open discussion explores street furniture ideas using participants' and designers' perspectives.</p>

<p>1B: Post-Note</p>	<p>10</p>	<p>Post-its stickers (3 colours) and Paper</p>	<p>Participants discussed more than ten photos, including the top three photos obtained from the survey data (rated on a scale of 1-3). The discussion covered various aspects, including benefits, designs, and issues. Participants then expressed their opinions by writing notes on 'Post-it' stickers and attaching them to the chosen photos.</p> <p>Participants used three colours to categorize their comments:</p> <ul style="list-style-type: none"> • Pink represents positive qualities. • Green represents social benefits. • Red represents issues or any harmful to the public. 
<p>2: Quick Sharing Presentation</p>	<p>30 (2 mins each)</p>	<p>Images *Printer</p>	<p>Participants bring photos of their hometown's or city's street seating, which enriches the study by showcasing diverse examples and reflecting personal and cultural preferences.</p> <p>*For Reference Only</p> <ul style="list-style-type: none"> • Explain why you chose the seating in the picture. • Discuss if the seating in the picture is of good or bad quality and why. • Following the previous task, do you think the seating in your picture is of good or bad quality? Why?

			 <p>User Preferences: Participants' discussions offer contextual insights into survey data on user preferences, providing designers with a visual understanding of how users perceive and interact with street seating in various contexts. Meanwhile, designers shared their views and compared.</p> <p>Design Validation: Designers can assess real-world applications through participants' photos, aligning with interview insights on design intentions and considerations. Participants can understand what the designer missed or valued and vice versa.</p>
3: Seating Configuration	20	Example photos of street seating	<p>Participants engaged in discussions focusing on how the configuration and arrangement of street seating designs can foster positive behaviours, offering valuable insights for potential improvements.</p> <p>They could either individually sketch or collectively arrange the proposed seating design, referring to a provided street seating design photo. Lastly, participants were instructed to affix their names together on the submission if done in a group.</p> <p><i>*For Reference Only</i> What positive behaviours can be encouraged through the seating arrangement, and what suggestions do you have for improvement?</p>

			
4: Sketching	30	Sketch Paper, Examples of Street Furniture photos.	<p>*Group of 3 following 3 designers</p> <p>Participants expressed their envisioned street seating designs through sketches, supplemented with detailed descriptions if needed. Designers assisted in translating these ideas onto paper, focusing on crucial elements such as a 5-year timeframe and proposing additional features. These inclusive preferences of users and designer opinion and insights.</p>  <p>To clarify their concept further, the researcher renders it in three dimensions. The researcher solicits group feedback on the design following completion and subsequent discussion. An illustration of the drawing is depicted in the image.</p> 

5: Closing - Thank You speech.	5	Script	The researcher expressed sincere gratitude to the participants for their time and valuable contributions to the PDW. Their diverse insights and collaborative efforts greatly enriched the research findings.
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Table 3-10: Illustrates the sequence of tasks the researcher conducted during the Participatory Design Workshop (PDW).

However, the process of conducting the PDW revealed several challenges. The dataset's large size increased its complexity, resulting in longer analysis times. Transcribing and identifying themes within presentation recordings proved more labour-intensive than analysing recorded conversations with experts, which utilised standardised questions. Despite these issues, the data obtained from the PDW was notably rich and valuable, offering significant insights.

3.7 Conclusion

In summary, by cross-validating information gathered in different ways, this data triangulation makes research results more solid and reliable (Turner & Turner, 2010). Participatory design workshops, interviews, surveys, and observations can all be combined to give a complete picture of street furniture design and how it affects how people act in public urban areas. The different data sources provide a more nuanced and complete picture, which lowers the chance of bias and makes the research more accurate overall. Working with designers [Industrial Designer, Built Engineers and Architects] in the PDW ensured that the results could help society by influencing the design of public places in cities, especially street furniture or seating. Eventually, the final findings and results obtained from all the methods and data triangulation are confirmed in a second meeting session with experts from the "Interview" and "PDWs" to validate the crucial findings directly relevant to the users. This is done through active consultation and co-design activities typical of PDWs.

CHAPTER 4

FINDINGS DATA

4.1 Chapter Introduction

This chapter thoroughly examines the findings derived from observations, surveys, interviews, and participatory design workshops. The diverse methodologies employed provide a solid basis for understanding active behaviours related to social sustainability through the design of street seating in urban public spaces. Each method offers distinct insights, collectively illustrating how street seating affects social interactions and behaviours in UK city centres, particularly in Manchester and Liverpool.

4.2 Observation Data Findings

A comprehensive and holistic investigation was undertaken to address the research questions and achieve the study's objectives. The initial phase involved an observational study focused on street seating design within the case study areas of Manchester and Liverpool. This section presents the findings from the observational study, structured around the three primary themes of the research: Product, People, and Space. The data presentation starts with the product theme, examining street furniture types and designs. It then transitions to People and Space, analysing how these designs can enhance active behaviour for social sustainability. The section concludes with analysing how street seating design facilitates diverse social activities in public areas and settings.

4.2.1 Product: Street Seating Audit

This section presents the audit results of 17 types of street seating found in Manchester (seven) and Liverpool (eleven). The audit aims to evaluate the effectiveness of various street seating designs in promoting active behaviours and contributing to social sustainability in urban public spaces. By examining a range of seating types, this study

seeks to identify the strengths and weaknesses of current designs, offering insights for future improvements.

The audit evaluated each seating type based on nine crucial factors derived from the thematic framework in Chapter 2 which encompassed Accessibility & Inclusivity (**A|I**), Ergonomics, Comfort & Functionality (**EC|F**), Craftsmanship, Timeless Appeal & Design Influences (**CTA|DI**), Aesthetics & Visual Appeal (**A|V**), Energy Efficiency, Modularity & Dematerialization (**EEM|D**), Economic, Sustainability & Community Centric Design (**ES|CC**), Materials; Sustainability & Durability (**MS|D**), Customizability & Integration (**C|I**), and Innovation, Originality & Social Behaviour Promotion (**IO|SBP**).

Each street seating type was assessed using a point scale of 2, 4, 6, 8, and 10, where '2' represents the lowest score and '10' represents the highest. Scores of six or higher indicate a good rating for the respective category, while scores below six indicate areas needing improvement. The table below summarises the audit results.

SITES	SEATING	A I	A V	MS D	EC F	EEM D	C I	CTA DI	ES CC	IO SBP	TOTAL
Exchange Square	Ramp Seating	8	8	8	6	8	8	6	8	10	70
	Wheel Seating	4	4	2	2	2	2	2	2	2	22
Market Street	Three-seater Seating	10	6	8	10	8	8	6	6	8	70
St Ann's Square	Concrete Seating	8	4	8	6	2	4	6	6	6	50
	Metal Seating	4	2	2	2	4	4	4	2	2	26
	Stone ball Seating	4	2	4	2	2	2	2	2	2	22
Liverpool One	Stairs Seating	10	6	10	6	8	4	8	10	10	72
	Stairs Seating (AG)	10	6	6	4	6	8	10	4	8	62
	Round Seating	6	6	6	6	6	8	8	8	8	62
	Grass Seating	4	4	4	6	6	4	6	6	6	46
Church Street (Paradise St)	Public Art Seating (A)	2	8	4	4	6	6	2	4	6	42
	Public Art Seating (B)	6	8	6	2	2	4	2	2	2	34
	Square Seating	8	6	8	8	6	8	6	8	8	66
	Wood Seating	6	8	8	6	8	6	8	6	6	62
Williamson Square (Richmond St, Houghton St)	Double-triple Seating	6	8	6	2	4	8	6	4	4	48
	Multi Seating	2	6	8	2	6	4	6	6	6	46
Clayton Square (Elliot St, Parker St)	Cement Seating	2	4	8	4	4	6	8	4	4	44
Total Points Each Categories		100	90	104	78	90	90	90	84	92	

Table 4-1: Street seating audit scores, Manchester and Liverpool, May 2018

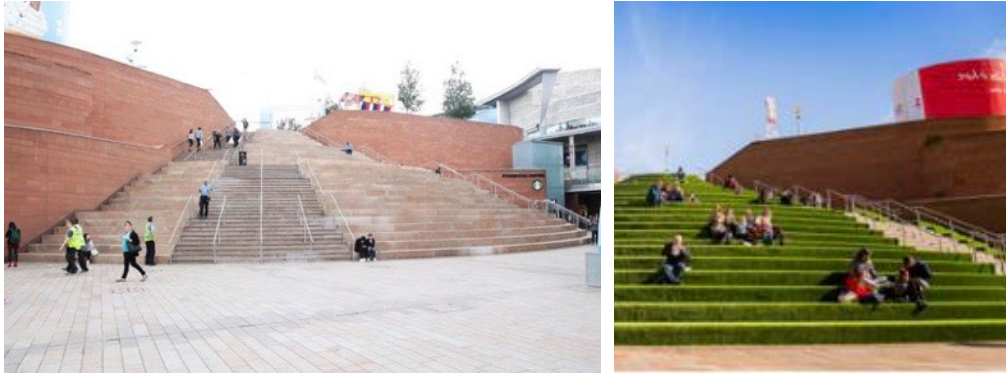
A I - Accessibility & Inclusivity	EC F - Ergonomics, Comfort & Functionality	CTA DI - Craftsmanship, Timeless Appeal & Design Influences
A C - Aesthetics & Visual Appeal	EEM D - Energy Efficiency, Modularity & Dematerialisation	ES CC - Economic, Sustainability & Community Centric Design
MS D - Materials; Sustainability & Durability	C I - Customizability & Integration	IO SBP - Innovation, Originality & Social Behaviour Promotion

4.2.1.1 Highest and Lowest Score Seating

High-Scoring Design: Stairs Seating

The table shows that the Stairs Seating in Liverpool One, Liverpool, is noteworthy for its strategic design, which accommodates many users, fosters social interaction, and serves as a multifunctional space. Its location in a spacious area with excellent visibility further enhances its attractiveness. These seating also become more attractive during summer as they lay the artificial grass (AG), making the whole scenery and environment fresher and inviting more people to join. Liverpool One (Stairs Seating) achieved the highest overall score of 72 points. The standard stairs seating and the "AG" variant consistently performed well across critical categories, including accessibility, inclusivity, and user engagement. This consistency highlights Liverpool One as a highly effective setting for fostering social interaction and providing practical seating solutions.

This seating design has received two different ratings in Ergonomics, Comfort, and functionality (EC|F), whereby normal seating without artificial grass scores more economically than placing artificial grass. However, the two seating options (regular stairs seating and the "AG" variant) received consistent marks across categories such as accessibility (A), inclusivity (I), and user engagement (UE), making this location one of the most effective in fostering social interaction and providing functional seating.



The figure 4-1: Showcases a seating design that encourages social interactions and provides ample capacity through its strategic layout—two different examples.

Source: Author, 2025.

Low-Scoring Design: Stone Ball Seating

Conversely, the Stone Ball Seating and Metal Seating in St Ann's Square received the lowest score of 22 and 26 points. This seating type performed poorly across most categories, notably in Ergonomics, Comfort and functionality (EC|F), Innovation, Originality, and social Behaviour Promotion (IO|SBP). These low scores underscore critical design deficiencies that impede usability and limit opportunities for social interaction. However, both seating types have relatively fair scores for Accessibility and Inclusivity (A|I), indicating an effort to accommodate diverse user groups.

St Ann's Square	Metal Seating	4	2	2	2	4	4	4	2	2	26
	Stone ball Seating	4	2	4	2	2	2	2	2	2	22

Table 4-2 indicates the lowest scores of the street seating audited.

A I - Accessibility & Inclusivity	EC F - Ergonomics, Comfort & Functionality	CTA DI - Craftsmanship, Timeless Appeal & Design Influences
A C - Aesthetics & Visual Appeal	EEM D - Energy Efficiency, Modularity & Dematerialisation	ES CC - Economic, Sustainability & Community Centric Design
MS D - Materials; Sustainability & Durability	C I - Customizability & Integration	IO SBP - Innovation, Originality & Social Behaviour Promotion



Figure 4-2 and Figure 4-3 illustrate both of the seating option with the lowest scores, which are, from left to right, the Stone Ball Seating at St Ann's Square and the Metal Seating at Manchester.

The seating illustrated in **Figures 4.2 and Figure 4.3** received the lowest audit score of 2 points for EC|F, which indicates its minimalistic design fails to meet basic ergonomic and functional requirements, rendering it ineffective in promoting active social behaviours. The lack of comfort and practical design elements contributes to its low usability and poor user satisfaction in the urban environment. Despite its durable construction, this seating design needs more ergonomic features, low aesthetics, and material durability scores. The lack of comfort results in low user satisfaction and minimal usage. Both designs, located in Manchester City, are ineffective in promoting social interactions due to deficiencies in ergonomics and aesthetic appeal.

4.2.1.2 Second Highest Score Seating

Ramp Seating in Exchange Square (**Figure 4.4**) received the second-highest audit score of 70 points. The seating design achieved maximum scores in Innovation, Originality, and Social Behaviour Promotion (IO|SBP), underscoring its efficacy in facilitating social interactions and creativity. The mean scores of eight points across numerous areas indicate that this seating form is appropriate for broad user demographics and versatile in various urban environments. Nevertheless, it achieved merely six points in Ergonomics, Comfort, and Functionality (EC|F) and Craftsmanship, Timeless Appeal, and Design Influence (CTA|DI), signifying the potential for enhancement in these

domains. Nonetheless, the seating demonstrated superior accessibility, durability, and user engagement, affirming its efficacy in improving the urban landscape. Despite being accessible and efficient, the temporary nature of the seating fails to offer adequate support for extended use. Addressing these ergonomic issues could significantly enhance its functionality and improve user satisfaction.



Figure 4-4: The Ramp Seating, Manchester

Meanwhile, **Figure 4.5** illustrates that the "Three-seater Seating" received commendable scores across all categories, averaging six, eight, and ten points. It also scores 70 points of total scoring. It particularly excelled in Accessibility and Inclusivity (A|I) and Ergonomics, Comfort, and Functionality (EC|F), indicating its effectiveness in providing accessible and inclusive seating. The design features ergonomic elements such as a backrest and armrest, and its width comfortably accommodates three people simultaneously. Its placement ensures easy access, enhancing its overall functionality.

Despite these strong scores, the seating uses stainless steel as its primary material, likely chosen for its resistance to corrosion and durability. Although stainless steel is renowned for its longevity and ability to withstand harsh external conditions, it may impart an additional sense of coldness to users depending on the weather. This aspect could affect user comfort, indicating a trade-off between material durability and user experience.



Figure 4-5: The Three-Seater Seating, Manchester

4.2.1.3 Lower Than Half Score Seating

The examination of the 17 street seating designs indicates that six designs—namely, The Wheel Seating, The Metal Seating, and The Stone Ball Seating in Manchester, as well as The Public Art Seating A and B, and The Cement Seating in Liverpool—have attained scores below fifty per cent of the maximum possible points. This research highlights shared issues among several design methodologies despite their distinct advantages. The mean score across several concepts was four points, with a maximum of eight points and a minimum of two points, indicating a range of performance that, although adequate, fails to achieve excellence. It is significant that no design attained a score of zero, signifying that a basic degree of usability is preserved throughout all seating categories.

The Cement Seating (**Figure 4.7**) and The Public Art Seating A (**Figure 4.8**) received 44 and 42 points, respectively, nearing but not attaining midway of the total score of 45 points. These scores indicate a moderate performance level, implying that although these seating types serve their fundamental purpose, they lack the uniqueness and quality necessary to improve societal sustainability substantially. Conversely, The Public Art Seating B (**Figure 4.8**) got 34 points, with two points being the maximum score in specific categories. Conversely, the remaining three sitting designs in Manchester City—The Wheel sitting (**Figure 4.9**), The Metal Seating (**Figure 4.3**) and The Stone Ball Seating (**Figure 4.2**)—received even lower scores of 22, 26, and 22 points, respectively.

Enhancements in aesthetic design, ergonomic features, and material choices could significantly improve the functionality and aesthetics of these seating types. These modifications will not only improve the immediate user experience but also further the overarching objective of developing public places that are socially sustainable and inclusive and promote community interaction and well-being.



Figure 4-6 and Figure 4-7 show that both the Public Art Seating and the Cement Seating in Liverpool scored close to, but did not reach, the halfway mark of the total score of 45 points.



Figure 4-8 shows Public Art Seating B, which scored 34 points, while Figure 4-9 illustrates the Wheel Seating, which received 22 points.

4.2.1.4 Highest-Scoring Street Seating Contributions to Social Sustainability in Urban Public Spaces

As this study examines seating that promotes social sustainability and social interaction, the three categories of Accessibility and Inclusivity (A|I), Material Sustainability and Durability (MS|D), and Interaction Opportunities and Social Behaviour Promotion (IO|SBP) are essential in evaluating street seating designs for their contribution to social sustainability in urban public spaces.

i. Accessibility and Inclusivity (A|I)

This category assesses how well the seating is designed for people of all abilities. It ensures that the space is inclusive, welcoming, and usable by everyone, promoting a sense of belonging and participation in the community.

ii. Material Sustainability and Durability (MS|D)

This category evaluates the environmental impact of the seating materials. It considers the materials' longevity and maintenance requirements, aiming to reduce the ecological footprint and ensure the seating remains functional and attractive over time.

iii. Interaction Opportunities and Social Behaviour Promotion (IO|SBP)

This category focuses on how the seating design encourages social interaction and community engagement. It assesses whether the seating arrangement and design features promote conversation, relaxation, and community among users.

The results for street seating in urban public places were predominantly high across the categories. The Stairs Seating at Liverpool One (**Figure 4.1**), the Three-Seater Seating at Market Street (**Figure 4.6**), and the Ramp Seating at Exchange Square (**Figure 4.5**) achieved high ratings, primarily ranging from 8 to 10. This signifies a strong focus on creating seating that accommodates a diverse range of users, including individuals with impairments, thereby reflecting the concepts of accessibility and inclusivity. Moreover, these sitting alternatives are crafted with a focus on material sustainability and promote social contact, so augmenting their role in the social sustainability of urban settings.

4.2.1.5 The Average Aesthetic and Functional Street Seating

The categories of **Aesthetic & Visual Appeal (A|I)**, **Custom and Integration (C|I)**, **Craftsmanship**, **Timeless Appeal**, and **Design Influence (CTA|DI)** evaluate street furniture from aesthetic and practical approaches. Visual Appeal assesses the attractiveness and beauty of the design within its urban or natural context. In contrast, Custom and Integration emphasise the design's harmony with the specific needs and identity of the area, as well as providing seamless compatibility with other urban elements. Craftsmanship evaluates the quality of materials, construction, and meticulous attention to detail, guaranteeing durability and user comfort. Timeless Appeal signifies the design's capacity to maintain relevance and visual appeal across time, bypassing trends that may lead to obsolete. Ultimately, Design Influence assesses the extensive effect of furniture on urban design, human behaviour, and the cultural character of the environment, potentially establishing new trends or achieving iconic status within its context. Collectively, these categories offer a thorough assessment of the role of street seating in enhancing the aesthetic, social, and functional effectiveness of public areas.

The audit table indicates that seating types, including Stair Seating (**Figure 4.1**), Ramp Seating (**Figure 4.5**), Double Triple Seating (**Figure 4.6**), Wood Seating (**Figure 4.7**), and Round Seating (**Figure 4.8**), regularly attained high scores (8-10 points) in a minimum of two major categories. This indicates that these seating designs excel in multiple aspects, enhancing their visual appeal, practical integration, craftsmanship, or other significant factors. Their advantage underscores their efficacy in elevating the quality of public places by providing aesthetically appealing, durable, and user-friendly seating solutions that promote social interaction and enhance the overall urban experience.

4.2.1.6 Highest and Lowest Scoring Categories Across Nine Key Categories

A total of 17 seating designs were analysed across nine categories, accumulating a combined total of 170 marks. **Material, Sustainability & Durability (MS|D)** were identified as the top-scoring categories, scoring 104 points in evaluating the existing

street seating designs. However, even the highest score of 104 is still far from the total 170 marks, indicating room for improvement in achieving the best practical seating designs. In contrast, **Ergonomics, Comfort & Functionality (EC|F)** obtained the lowest scores, accumulating only 78 points across all categories. This underscores a distinct imbalance, wherein designs demonstrate superior material quality and long-term sustainability yet must deliver ideal comfort and user-friendly functionality. The findings indicate that future enhancements in urban seating design should focus on optimising ergonomics, comfort, and functionality to address the requirements of public space users effectively, hence promoting a more holistic approach to urban furniture design.

4.2.1.7 The Same Scores Across Three Categories: A Comparative Evaluation of Nine Categories

Craftsmanship, Timeless Appeal, & Design Influence (CTA|DI) emphasise street seating designs' quality, durability, and trend-setting capabilities. **Energy Efficiency, Modularity, & Dematerialisation (EEM|D)** prioritises sustainability by minimising material consumption, optimising energy-efficient production, and offering versatile, changeable seating arrangements. **Customisability & Integration (C|I)** focuses on the compatibility of seats with the local environment and their adaptability to requirements. Each category scored 90 points, exceeding half of the 170 points, underscoring their importance in the overall assessment.

The findings suggest an inequitable assessment. Achieving 90 points, over half the potential 170 points, indicates that the chair designs excelled in critical aspects, including Craftsmanship, Timeless Appeal, Design Influence, Energy Efficiency, and Customisability. These factors are essential for enduring durability, ecological sustainability, and flexibility. Nevertheless, the affected scores in categories such as Ergonomics, Comfort, and Functionality underscore a need for more user-centred design.

CTA|DI prioritises aesthetics and long-term impact, whereas **EEM|D** emphasises environmental efficiency and practicality. **C|I** achieve equilibrium by providing versatile seating that integrates well with the environment. Achieving more than fifty percent of the total points highlights the significance of these criteria in evaluating the effectiveness of street sitting, as they harmonise design excellence, environmental sustainability, and functionality. Nonetheless, there is potential for enhancement in user comfort and practical utility, both crucial for public satisfaction and the overall efficacy of urban seating designs.

4.2.2 People and Space: Street Seating Observation

The table below outlines the timetable that specifies the sites and street seating types, the dates and times of observations, and the weather conditions throughout this study. The observational study for this research spanned 29 hours, representing seven case study sites across Manchester and Liverpool. Each case study consisted of two or three sections, as described in the Research Methods chapter, totalling 16. Data were collected on weekdays and weekends, with temperatures ranging between 10°C and 23°C from late July 2018 to early August 2018. Observations continued despite varying cloud cover and wind conditions; however, none were conducted during rain, except for occasional drizzle (refer to timetable).

Manchester Sites

Sites	Seat / Sec	Day / Date	Audit Hours	Weather
Exchange Square	Wheels / 1	SAT 21st July 2018	1100 – 1200	13° (Sunny)
	Ramp / 1	SAT 21st July 2018	1700 – 1800	15° (Sunny)
	Wheels / 1	MON 23rd July 2018	1500 – 1600	11° (Cloudy)
	Ramp / 2	MON 23rd July 2018	1600 – 1700	13° (Cloudy)
Exchange Square	Ramp / 1 & 2	TUES 28 th Aug 2018	1800 - 2100	14° (Cloudy)
Market Street	Three-Seater / 1 & 2	SAT 21st July 2018	1300 – 1400	12° (Showers)
	Three-Seater / 1	MON 23rd July 2018	1100 – 1200	15° (Sunny)
	Three-Seater / 2	THURS 26th July 2018	1700 – 1800	15° (Sunny)

Market Street	Three-Seater / 1 & 2	MON 27 th Aug 2018	1800 - 2100	14° (Cloudy)
St's Ann Square	Concrete / 1 & 2	SAT 21 st July 2018	1500 – 1600	15° (Sunny)
	Concrete / 1 & 2	SAT 21 st July 2018	1600 – 1700	15° (Sunny)
	Concrete / 1 & 2	SUN 22 nd July 2018	1500 – 1600	18° (Sunny)
	Concrete / 1 & 2	SUN 22 nd July 2018	1500 – 1600	18° (Sunny)
	Stone / 3	MON 23 rd July 2018	1300 – 1400	13° (Cloudy)
	Metal / 2	THURS 26 th July 2018	1100 – 1200	18° (Sunny)
	Metal / 2	THURS 26 th July 2018	1200 – 1300	18° (Sunny)
St's Ann Square	Concrete, Stone and Metal / 1 & 2	WED 29 th Aug 2018	1800 - 2100	16° (Cloudy)

Table 4-3 Manchester's street seating observation

Liverpool Sites

Sites	Seat / Sec	Day	Audit Hours	Weather
Liverpool One	Grass / Ground	SUN 5 th Aug 2018	1000 – 1100	13° (Sunny)
	Stairs / 1	SUN 5 th Aug 2018	1100 – 1200	15° (Sunny)
	Stairs / 2	SUN 5 th Aug 2018	1500 – 1600	17° (Sunny)
	Grass / Ground	TUES 7 th Aug 2018	1500 – 1600	17° (Sunny)
	Grass / Ground	TUES 7 th Aug 2018	1600 – 1700	17° (Sunny)
	Stairs / 1	TUES 7 th Aug 2018	1100 – 1200	15° (Sunny)
	Stairs / 2	TUES 7 th Aug 2018	1200 – 1300	15° (Sunny)
Liverpool One	Grass / Ground	SAT 11 th Aug 2018	1800 - 2100	15° (Cloudy)
Church Street	Square / Wood / 1&2	SUN 5 th Aug 2018	1700 – 1800	19° (Sunny)
	Public Art	SUN 5 th Aug 2018	1700 – 1800	15° (Sunny)
	Square / Wood / 1&2	TUES 7 th Aug 2018	1300 – 1400	15 (Sunny)
	Public Art	TUES 7 th Aug 2018	1300 – 1400	15° (Sunny)
Church Street	Square / 1&2	WED 15 ^h Aug 2018	1800 - 2100	14° (Cloudy)

Williamson Square (Richmond St, Houghton St)	Double Triple / Multi	TUES 7 th Aug 2018	1100 – 1200	11° (Shower)
	Double Triple / Multi	SUN 5 th Aug 2018	1500 – 1600	21° (Sunny)
Clayton Square (Elliot St, Parker St)	Cements / 1 & 2	SUN 5 th Aug 2018	1300 – 1400	17° (Sunny)
	Cements / 1 & 2	TUES 7 th Aug 2018	1700 – 1800	11 (Cloudy)
Clayton Square	Cements / 1 & 2	SUN 12 th Aug 2018	1800 - 2100	14° (Cloudy)

Table 4-4 Liverpool's street seating observations

The study thoroughly examined each case study site, carefully documenting the active behaviours contributing to social sustainability in urban public spaces. As previously mentioned, this study identified 17 different types of street seating. Through walk-by observations, the author analysed how people utilised the seating and engaged in various activities. The following section provides a detailed report of these observations.

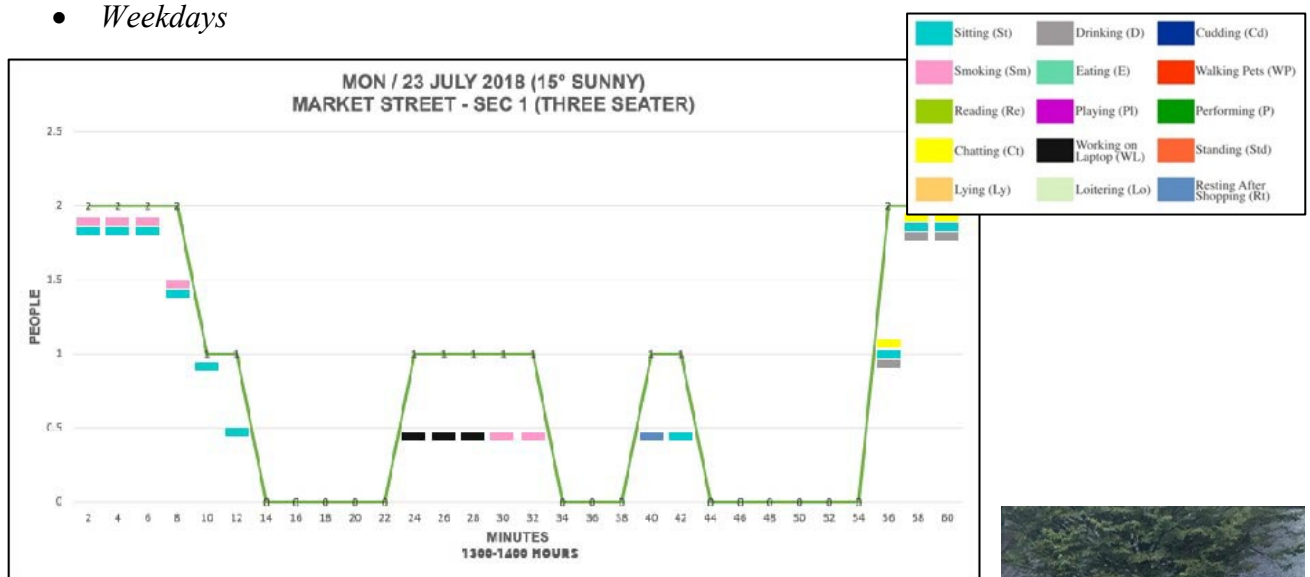
4.2.2.1 The Usage Patterns: Peak and Non-Peak Hours on Weekdays and Weekends (People)

i. Timeframe of seating usage at Market Street, Manchester (Three-Seater).

These two graphs (Figure 4.10 and 4.11) depict the user behaviour on weekdays and weekends, between 13:00 and 14:00 hours at Market Street, Section 1, in Manchester, allowing us to compare the seating usage. This segment of Market Street was selected for its central location and common three-seater bench, attracting a diverse mix of commuters, shoppers, and visitors. It highlights the typical use of urban seating across different days and weather conditions. During the bright weekday, the maximum interval between users was approximately 25 minutes, accompanied by only brief and irregular seating utilisation. This indicates that on weekdays, individuals may have limited time for extended breaks, utilising seats for short intervals as part of their everyday activities, such as a quick break between jobs.

Conversely, the weekend graph indicates more frequent and prolonged usage, with shorter intervals between users. The most significant interval on the weekend is roughly 10 minutes, signifying a more substantial user turnover relative to weekdays. The extended duration of persons seated during the weekend implies that they may possess increased leisure time for social engagement and relaxation, even in unfavourable weather circumstances. Weekends are anticipated to offer increased opportunities for social contact and relaxation, evidenced by the prolonged use of seating. The hypothesis is that individuals are more inclined to use public seating during their leisure time on weekends, resulting in heightened social interactions.

- Weekdays*



- Weekend*

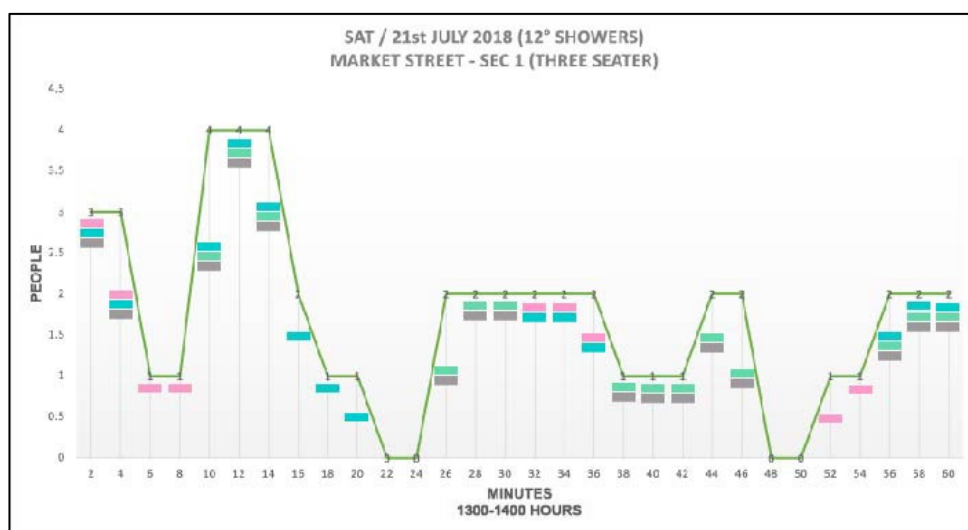


Figure 4-10 shows the weekday or working day observation scenario, and Figure 4-11 illustrates the weekend observation scenario at the same place and

Weekday observations indicate that seats are predominantly utilised for short intermissions among hectic schedules, with users allocating minimal time for repose. This suggests a demand for street seating that is accessible and inclusive, offering necessary rest areas for commuters or workers who may lack sufficient time for relaxing. The extended intervals between users on weekdays indicate that these benches have a practical purpose rather than promoting extended social interaction.

The weekend observations illustrate a contrasting scenario. The frequency and length of seated utilisation markedly increase, characterised by reduced gaps between users and extended repose times. This pattern reinforces that weekends offer a more leisurely atmosphere favourable for social connections. The prolonged usage of seats during weekends indicates that street furniture is crucial in facilitating social interaction and encouraging active leisure activities. The results correspond with the principles of Economic, Sustainability & Community-Centric Design (ES|CC) and Innovation, Originality & Social Behaviour Promotion (IO|SBP), suggesting that thoughtfully designed seating fosters public interaction and enhances the vibrancy of urban environments.

Furthermore, the ergonomic and comfort features of the seating design, especially the three-seater bench, illustrate its efficacy in accommodating individuals and small groups. This reinforces the notion of Ergonomics, Comfort, and functionality (EC|F) since the design accommodates diverse users, from individuals desiring a brief respite to groups participating in extended social interactions. During weekends, when social interactions are heightened, these benches transform into centres of social engagement, promoting community interactions and cultivating a sense of belonging.

The Aesthetics and visual Appeal (A|V) of the seats, along with their strategic location in a central, high-traffic area, enhance their frequent use. This guarantees that the seating fulfils a utilitarian role while improving the urban landscape, following Craftsmanship, Timeless Appeal, and Design Influences (CTA|DI). Integrating these aspects, street seating fosters a more welcoming and socially dynamic environment, enhancing community well-being and supporting social sustainability principles.

The sitting utilisation patterns along Market Street underscore the significance of thoughtfully designed, accessible urban furniture in promoting social sustainability. These seats facilitate brief and prolonged social contacts, enhancing urban liveliness and creating socially viable public places.

However, the atmosphere in central Manchester, especially at Exchange Square, has significantly transformed after business hours. Despite being a weekday, the area has a gradual rise in visitors from 17:00 to 18:00. The time frame aligns with the conclusion of the workday, resulting in the area attracting an increased number of individuals seeking relaxation or social interaction post-office hours. The activities noted during this one-hour interval show the importance of closing hours for office employees.

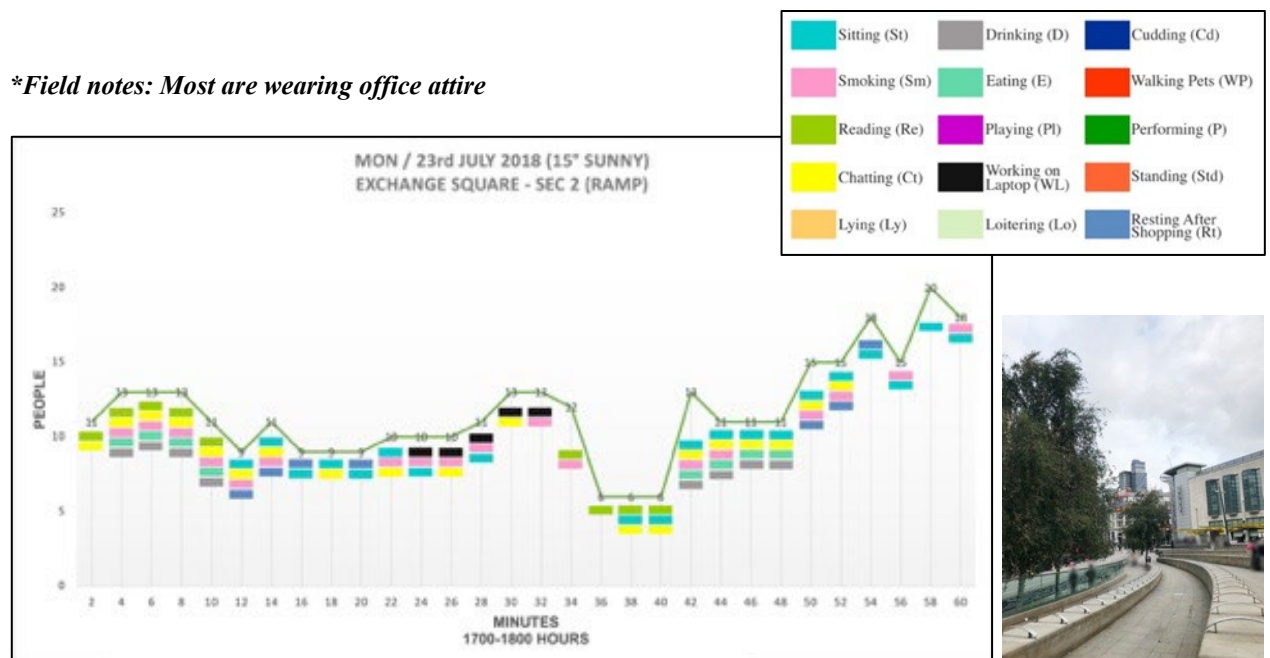


Figure 4-12 Exchange Square, Manchester July 2018

The data depicts the number of users utilising the ramp seating at Exchange Square throughout a 60-minute period from 17:00 to 18:00. The data reveals variable occupancy levels, with a consistent pattern of increasing utilisation with time, particularly in the latter half of the observation period. Initially, occupancy remains steady, varying between 12 and 14 individuals throughout the first 10 minutes. At roughly the 10-minute point, the user count declines to around 8 before rising up again between the 25-30-minute timeframe, reaching a peak of approximately 20 individuals. A significant decline occurs, with occupancy falling to 5 or fewer throughout the 35-45-minute

interval before rising again towards the hour's conclusion, reaching 21 individuals by the 58th minute.

The consistent arrival of persons, without significant surges or congestion, indicates a tranquil and pleasant environment throughout this period. The agreeable weather (15°C and sunny) certainly facilitated the regular utilisation of sitting, prompting individuals to linger in smaller groups for informal social interactions and short breaks. This environment promoted a leisurely user experience, highlighting the ramp seating's attractiveness as a setting suitable for post-work relaxation and social interaction.

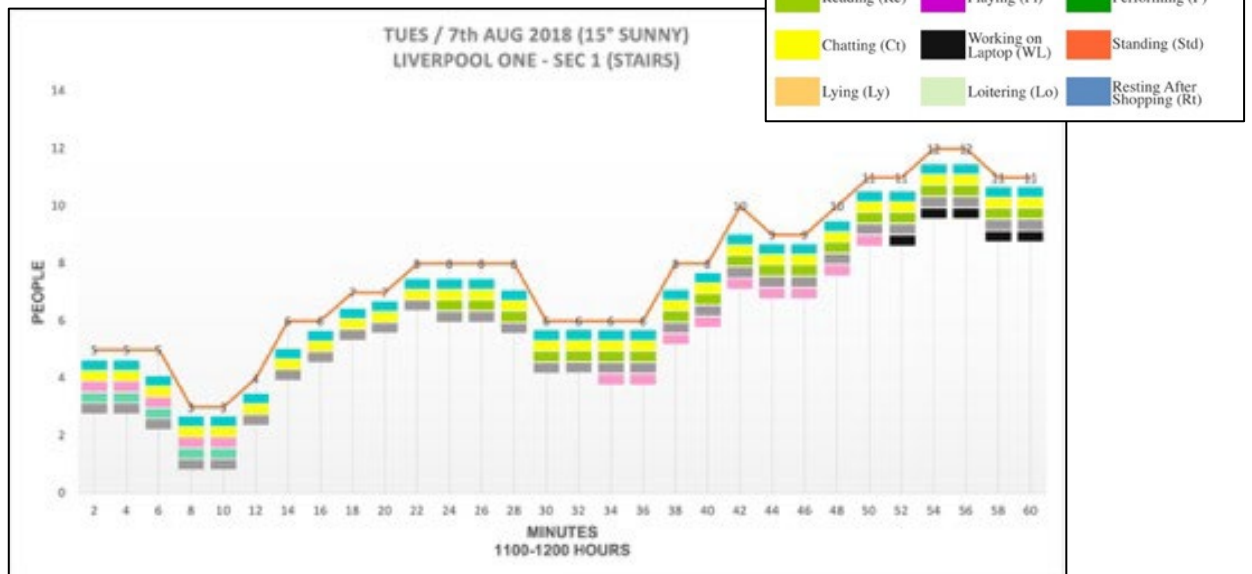
ii. Patterns of Activity and Justification of Stairs Seating Usage at Liverpool ONE. (People)

The weekday and weekend trends analysis at Liverpool ONE (Stairs) reveals significant activity and user behaviour differences. Numerous activities were noted, including sitting, chatting, reading and resting post-shopping. The variety of activities indicates that users utilised the space for both practical and recreational objectives, shaped by the everyday context in which individuals are often on short breaks or transiting while working or shopping. Conversely, during the weekend, there was an increase in the number of individuals utilising the seating but a decrease in the variety of activities. Most users were sitting, resting, or reading, indicating that weekend activities are predominantly focused on leisure and prolonged presence in the vicinity. This may be related to users' increased leisure time for recreational activities, leading to extended usage durations.



The primary activity throughout both intervals was sitting, perhaps due to the stair arrangement encouraging informal seating. Infrequently seen actions, such as smoking and using laptops, are likely affected by the lack of privacy or specific spaces for these behaviours. The seating, time, and nature of adjacent events considerably influence the variety and kind of activities observed, with increased spontaneous social contacts and leisure behaviour occurring on weekends.

- Weekdays*



- Weekend*

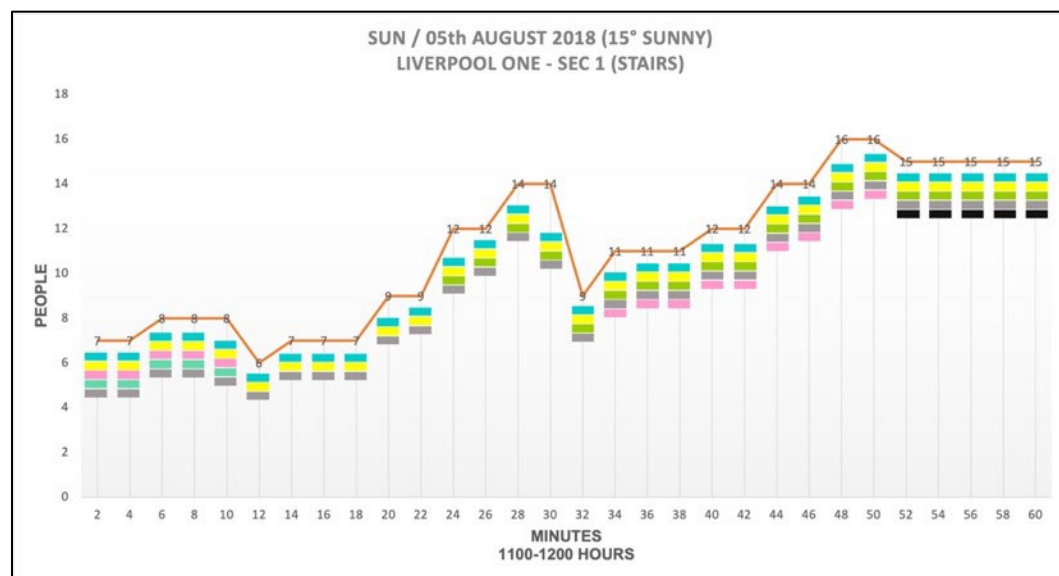


Figure 4-13 and Figure 4-14 show the two examples of the frequency numbers of people observed on weekends and weekdays at Liverpool ONE.

In conclusion, the seating on the stairs reveals a clear connection between seating design and social behaviour. On weekdays, the seating supports varied, functional activities like resting and short interactions, reflecting the needs of a work-driven crowd. On weekends, it encourages more relaxed, prolonged social engagements such as chatting and socialising. The flexible and open design of the seating plays a key role in fostering these different social behaviours, illustrating how well-planned street seating can promote active social interaction depending on the time and user needs.

4.2.2.2 Weather Influence – (Environment / Space)

The weather significantly affected the utilisation of public seating in St Ann's Square during the two observation periods on Saturday and weekend. Observations were performed in two segments of the square:

Section 1 (11:00 - 12:00 | 11°C, Windy)

During Section 1's observation, the temperature was notably low at 11°C, accompanied by windy conditions. The unfavourable and cold weather conditions significantly hindered social activities and the use of the seating area. The graph demonstrates that just two individuals used the seating simultaneously, primarily participating in brief activities such as smoking and reading.

The frigid weather discourages individuals from remaining outdoors for extended durations. The graph illustrates that following a short duration of activity in the initial 30 minutes, the area became entirely unoccupied, with minimal utilisation of the seating available. This indicates that severe weather conditions, even during weekends, limit social engagement and interaction in outdoor public spaces since individuals favour inside environments when dealing with uncomfortable temperatures and strong winds.

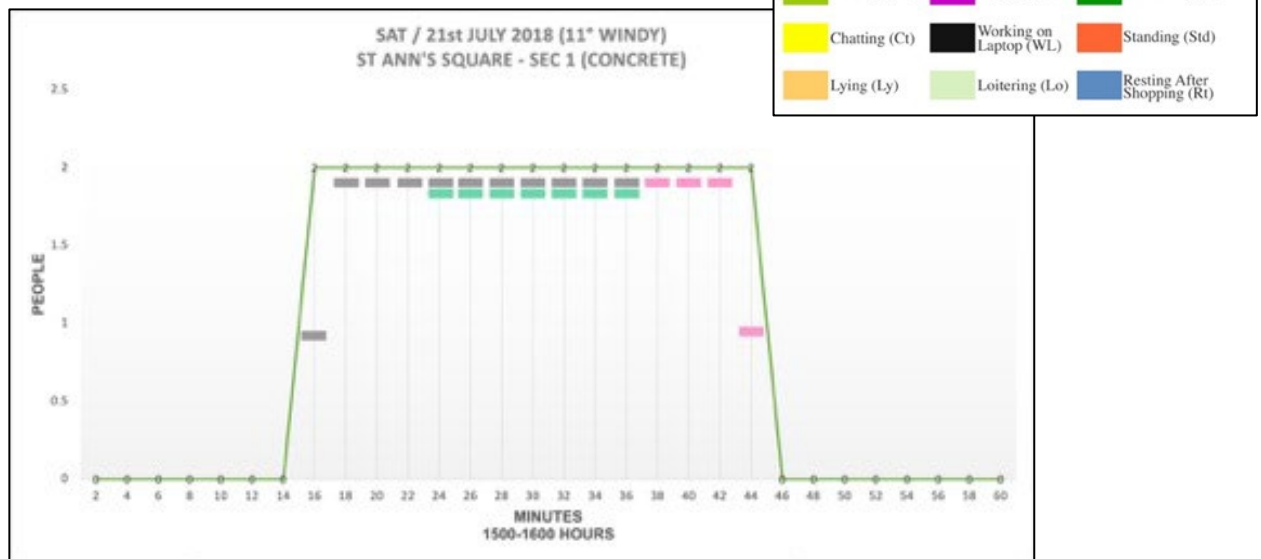
Field notes: Cold and Windy

Figure 4-15: Example of windy weather scenario, St Ann's Square, Manchester, July 2018. Drinking, eating, and smoking were the activities shown, assuming the users were trying to warm themselves.

Section 2 (16:00 - 17:00 | 15°C, Sunny)

In contrast, the observation in Section 2 presents an opposing story, indicating a substantial improvement in the weather after 16:00. The temperature increased to 15°C, and the sun emerged around the 26th minute, significantly transforming the environment. The data illustrates a significant increase in seating usage, with occupancy doubling within minutes. Interactions such as chatting, eating, and drinking became more frequent, suggestive of the increased comfort brought by warmer temperatures and increasing sunlight.

This pleasant change in the weather attracted more individuals outdoors and prompted them to remain longer. The seating area was continually packed for around 14 minutes following the sun's emergence, with individuals participating in social activities, including smoking and chatting. In contrast to the previous observation of limited occupancy, the warmer temperatures fostered a more vibrant atmosphere. Following a short pause, the seating experienced an upsurge of activity as small groups continued to use the area for social interactions.

The observations at St Ann's Square during adverse weather conditions demonstrate how environmental factors significantly impact social interactions in urban spaces. With the temperature at 11°C and accompanied by windy conditions, the use of public seating was notably limited, as most individuals engaged in brief activities such as smoking or reading before leaving. This situation relates to **Comfort and Functionality**, where discomfort caused by unfavourable conditions deters individuals from staying in outdoor spaces for extended periods. It highlights the importance of designing urban seating that offers shelter and warmth, enhancing usability even in less favourable weather.

The minimal use of the seating during colder conditions also aligns with **Facilitating Social Interaction**, indicating that outdoor furniture should be designed to encourage social engagement, even when weather conditions are less than ideal. Features such as overhead covers or wind barriers can help maintain the social purpose of public spaces regardless of the weather.

Moreover, this limited engagement highlights the need for **Adaptability and Integration**. Seating that can adapt to environmental changes or provide comfort-enhancing features (such as heated surfaces or sheltered seating areas) would maintain its appeal and functionality across different seasons.

From a **Community-Centric Design** perspective, ensuring that public spaces offer inclusive and weather-resistant seating options elevates their overall quality and attractiveness. Thoughtful seating designs that accommodate varying weather conditions can sustain social interaction, thereby enhancing the sense of community by making urban spaces more accessible and inviting throughout the year.

This evaluation underlines the importance of incorporating environmental resilience and user comfort into seating designs to promote social interaction and ensure that public spaces contribute to community well-being in all seasons.

Field notes: The temperature gradually increased, and it suddenly became sunny.

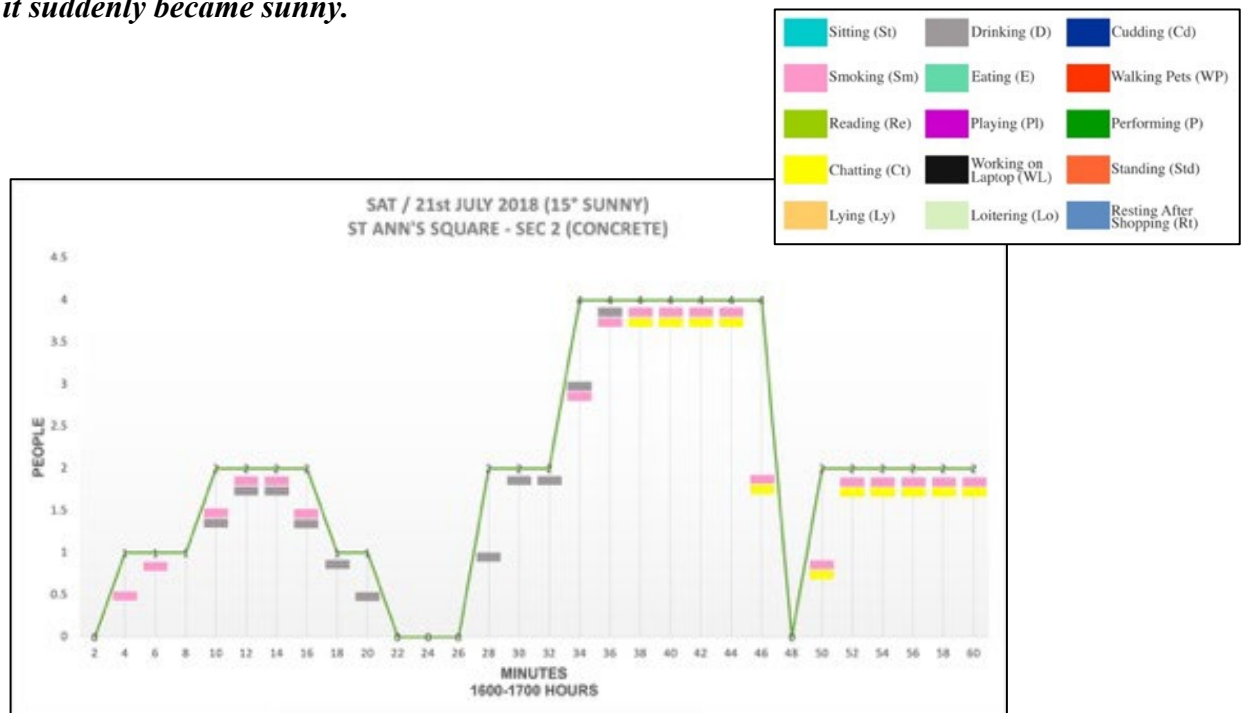


Figure 4-16 Example of sunny weather scenario, St Ann's Square, Manchester, July 2018

Comparison and Weather Influence

The comparison of Section 1 (15:00-16:00) and Section 2 (16:00-17:00) strongly underscores the influence of weather on public seating utilisation. During the colder, windier period of Section 1's observation, seating utilisation was minimal, as individuals promptly departed following short, solo activities. The cold and wind served as discouraged prolonged use despite it being a weekend, a time usually linked to increased outdoor activity.

Meanwhile, in Section 2, when the temperature increased, and the sun emerged, the seating area experienced a notable rise in utilisation. The warmer temperatures and increased sunlight make the area more appealing, encouraging individuals to linger, participate in social interactions, and utilise the seating more effectively. The quite atmosphere turned into a somewhat noisy environment where people started drinking coffee, smoking among friend and chatting with strangers too. The graph indicates a significant rise in social interaction during this time frame, illustrating that weather

enhancements motivate individuals to frequent public areas and facilitate a transition from solitary to social behaviours.

The evidence clearly demonstrates that weather, especially temperature and sunlight, significantly impacts the use of urban public spaces. Witty weather limits activity, whereas ideal conditions can convert a peaceful, unused area into a vibrant hub of social interaction, as exemplified by St Ann's Square on the same day.

4.2.2.3 How Different Seating Designs Affect User Experience and Behaviour in Centrally Located Public Spaces (Product)

Earlier investigation revealed a significant disparity in visitor numbers between weekends and weekdays. Moreover, the atmosphere and activity within the studied sections demonstrated considerable variance. During weekdays, the atmosphere was tranquil, possibly due to the occurrence of working hours and days. Documented activities comprised people consuming lunch, unwinding with cigarettes, interacting with their mobile devices, and utilising laptops for work.

Conversely, on weekends, individuals dedicated increased time to family and friends. Although activities like lingering, dining, drinking, sitting, and conversing were still apparent, more prominent events encompassed engaging with children, relishing weekends with pets, and socialising with friends. Furthermore, several municipal council activities were recorded. Nevertheless, the seating arrangement significantly influences the scenario, even when both sitting styles are positioned centrally within the area. The graph below depicts this phenomenon.

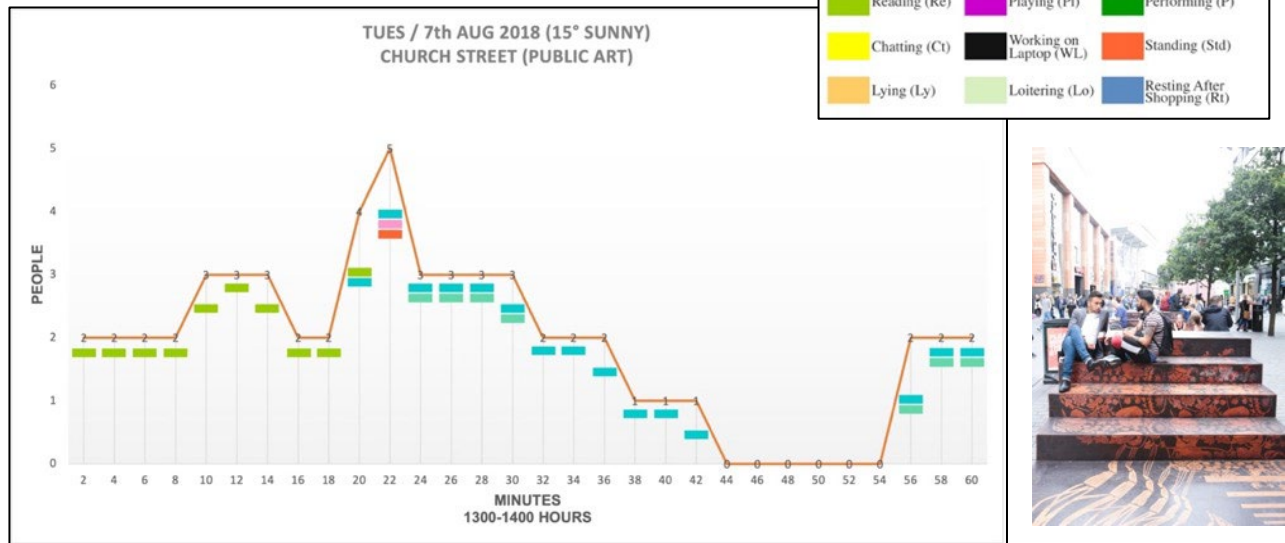
Field notes: Good Weather

Figure 4-17 - The graph illustrates a relatively low and sporadic use of the seating, with sitting and reading being the most frequent activities.

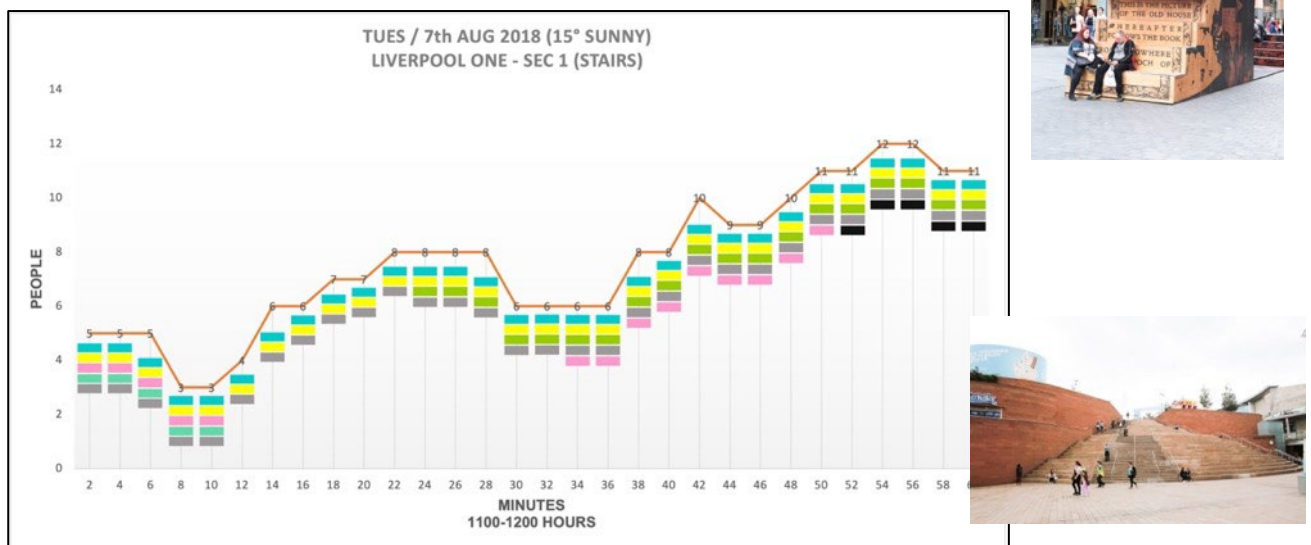


Figure 4-18, Graph showing the activity levels at Liverpool One's Section 1 stairs. The seating attracted a diverse range of activities and displayed steady usage.

The two graphs depict public sitting utilisation trends on Tuesday, August 7, 2018, during sunny weather (15°C). The initial graph shows activity at Church Street (Public Art), where seats reached a maximum of 5 users at approximately 22 minutes, mainly engaged in sitting and reading. Activity was moderate throughout the hour, with several gaps of no usage.

The second graph illustrates data from Liverpool ONE (Stairs). It indicates a consistent increase in seating utilisation, culminating in a peak of 12 individuals at approximately the 58th minute. Users engaged in activities like sitting, chatting, drinking, and smoking, illustrating the stairs' adaptability and accessibility for social interaction. Observation also reveals two essential factors in facilitating social activities:

- i. **Seating Design and Capacity:** The seating structure, particularly regarding the stair sitting at Liverpool ONE, facilitates versatile utilisation, permitting individuals and groups to occupy the space concurrently. This multi-tiered design increases surface area and seating possibilities, facilitating extended and more social engagements. In contrast, while visually captivating, public art seating requires greater flexibility, constraining its potential to foster social connections.
- ii. **Comfort and Accessibilities:** The seating on the Liverpool ONE stairs enhances accessibility and comfort, which is essential in promoting prolonged visitation. The expansive design facilitates social interaction and relaxation, allowing individuals to converse or rest post-shopping without experiencing crowding or confinement. Conversely, while important, the public art seating seems more ornamental than practical, potentially hindering its capacity to draw big crowds or encourage extended social interaction.

In conclusion, flexible, comfortable, and strategically positioned seating in core areas fosters increased and extended social interactions. Proper seating design and placement are crucial in cultivating dynamic public spaces. For example, seating in high-traffic zones, such as the Liverpool ONE steps, encourages greater use due to its open and inviting nature, supporting spontaneous social connections and accommodating varying group sizes. In contrast, rigid designs like public art seating may limit social adaptability, restricting larger gatherings. Therefore, seating arrangements that offer flexibility and multiple configurations are more effective at promoting social engagement in urban settings.

4.2.2.4 Influence of External Events on Street Seating Utilisation at the Surrounding Area. (Environment)

Observations in Manchester and Liverpool show that external events significantly influence public seating usage, regardless of seating type or audit scores. Despite differences in scores—46 points for the multi-seater in Williamson Square, Liverpool, and 70 points for the three-seater in Market Street, Manchester—both were consistently occupied, especially during events like the **Bee Awareness** campaign in Liverpool and the **Health Awareness** campaign in Manchester.

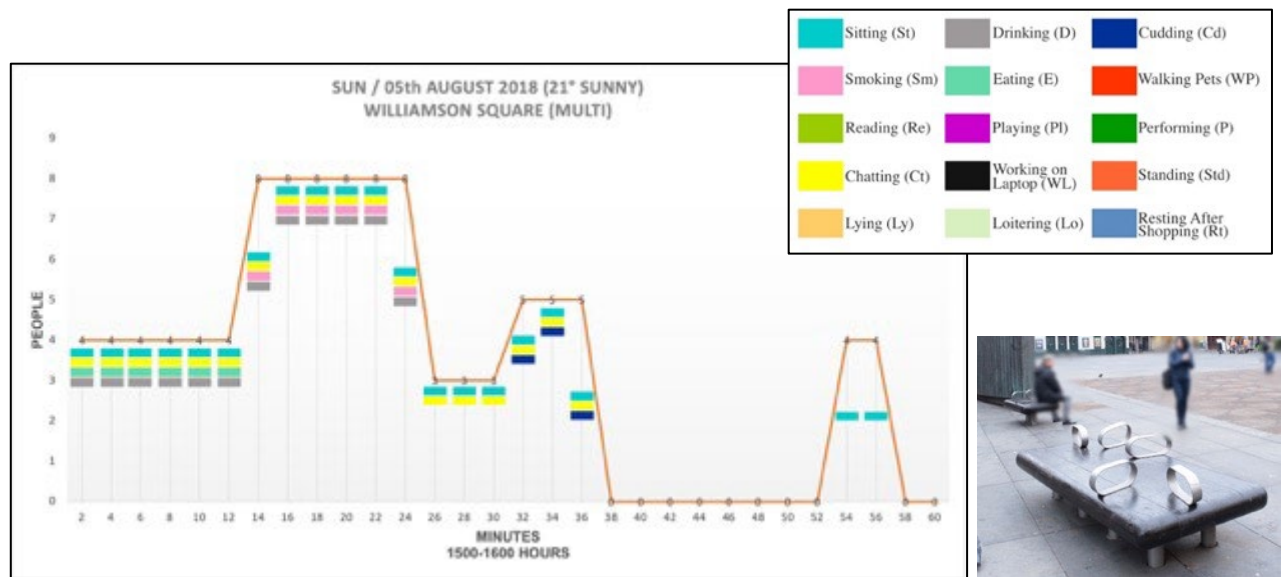
Williamson Square (Multi-Seater | 46 Points | Bee Awareness)

On Sunday, the multi-seater in Williamson Square attracted a steady flow of people between 15:00 and 16:00, with the graph showing peaks of up to eight users at a time. The activities observed included sitting, smoking, chatting, and drinking, suggesting a relaxed, social atmosphere. The Bee Awareness event organised in the area appears to have contributed to the consistent use of the seating, as it provided a convenient spot for people to gather, interact, and take breaks from the event. Despite scoring lower in the audit (46 points), the seating remained highly utilised due to the attractive environment and the presence of the external event.

Market Street (Three-Seater | 70 Points | Health Awareness)

Similarly, on Saturday, the three-seater bench on Market Street, which scored a higher 70 points in the audit, experienced consistent use despite the less favourable weather conditions. Between 11:00 and 12:00, the bench was frequently occupied, with activities such as sitting, reading, and resting after shopping is common. The Health Awareness campaign organised in the area likely encouraged people to use the seating as they participated in or observed the event. This indicates that external events, like the Health Awareness campaign, can encourage greater public engagement with seating, even when the weather is not ideal.

Field notes: Bee's Awareness Campaign



Field notes: Health Awareness Campaign

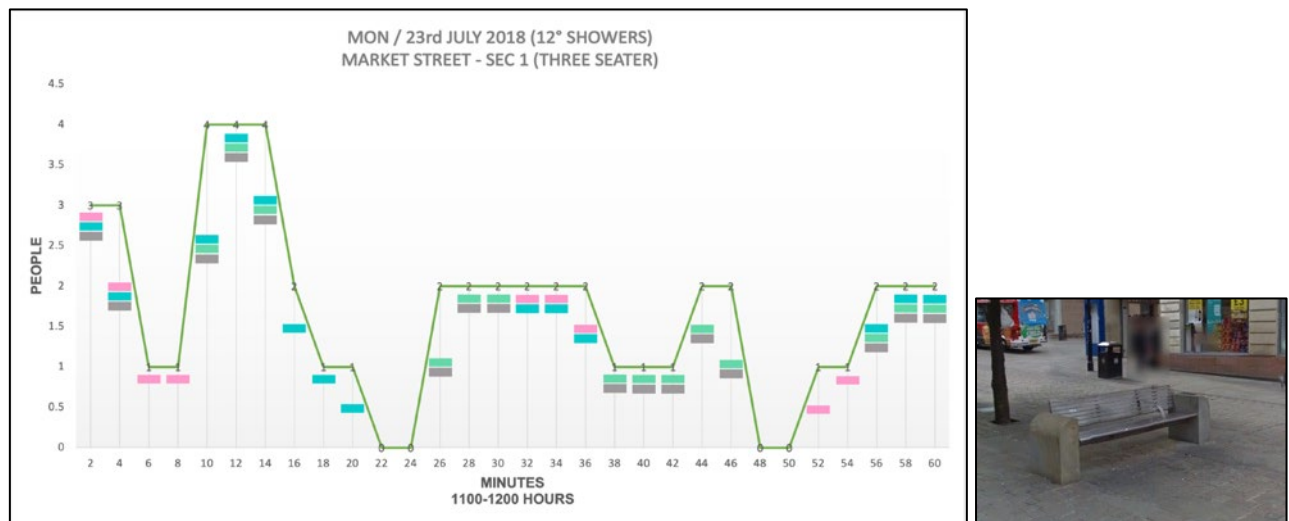


Figure 4-19 and Figure 4-20 illustrate the two events occurring in the urban open space.

Influence of External Events on Social Engagement

The comparison between these two seating types illustrates the critical role that external events, such as Bee Awareness in Liverpool and Health Awareness in Manchester, play in driving social engagement in public spaces. Despite their significantly different audit scores, the multi-seater in Liverpool and the three-seater in Manchester saw high occupancy levels. This suggests that while seating design and functionality are

important, external events can greatly enhance public seating use and promote social interaction.

The increased frequency of activities like chatting, drinking, and resting after shopping during these events highlights how street seating becomes a focal point for social gatherings when placed in the right context. This underscores the idea that well-placed seating and external events are vital for encouraging community interaction and social engagement. Furthermore, seating arrangements that maximise space efficiency, such as modular and multi-level designs, offer the flexibility needed for various group sizes and activities, supporting social interaction. Community-oriented designs further enhance social engagement by catering to the needs of users, fostering a sense of belonging and encouraging longer stays in public spaces. This approach can also boost local economic activity, as individuals are more likely to linger and socialise in well-designed environments.

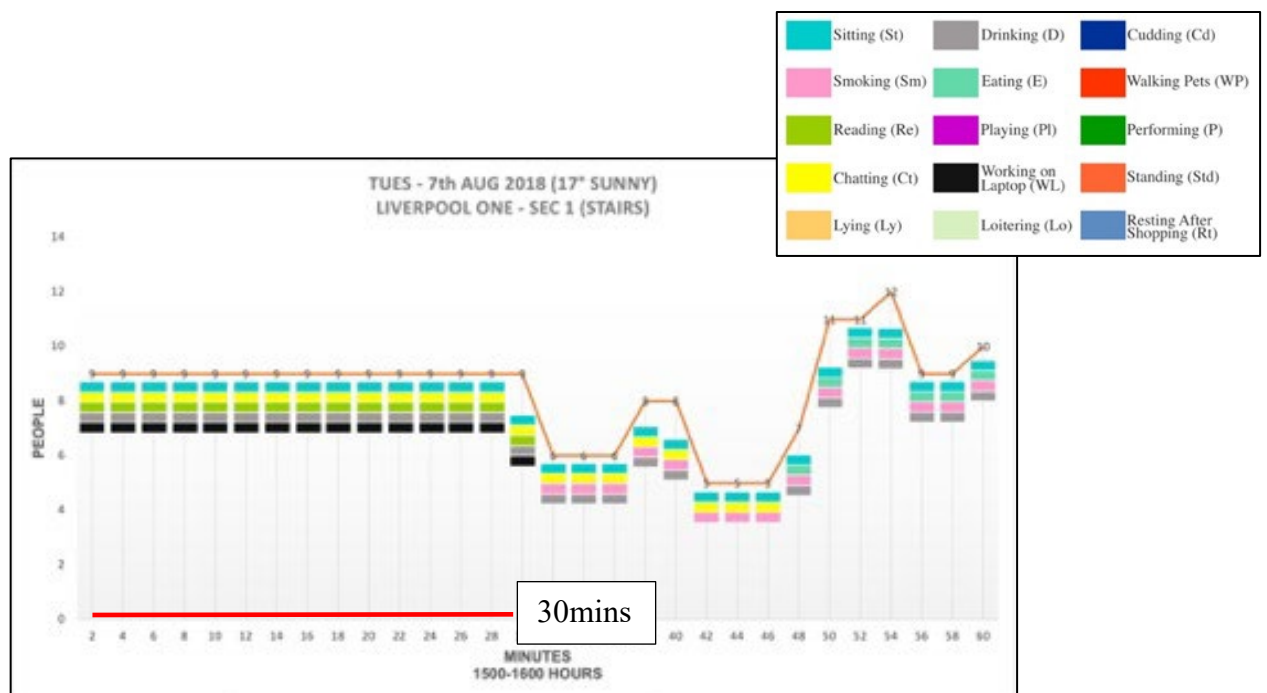
Using durable materials ensures that seating remains functional over time, promoting ongoing social interaction without requiring constant maintenance. Additionally, seating designs that seamlessly integrate into diverse environments allow for a broader range of social activities, fostering an inclusive atmosphere. Innovative designs that adapt to different settings encourage spontaneous gatherings and interactions, making public spaces more dynamic and engaging for all users.

4.2.2.5 The Longest Social Activities Observed (People and Product)

The two graphs illustrate different activities recorded at Liverpool ONE on distinct days. On Sunday, August 5, 2018, individuals participated in social activities for up to 60 minutes, exhibiting a remarkable variety of actions, including resting after shopping (blue), sitting (light blue), smoking (pink), conversing (yellow), and performing (green). The diverse range of activities suggests that the seating accommodates individual leisure and group engagement. The lengthy duration and regularity of activities indicate that the seating, owing to its design and spaciousness, facilitates extended social interaction, especially on weekends when individuals have increased leisure time.

On Tuesday, August 7, 2018, the graph indicates a more temporary seating utilisation, with individuals participating in activities for approximately 30 minutes. The primary activities consist of sitting and smoking, along with chatting and working on laptops (black), indicating a blend of social and individual involvement, though with less variety than on the weekend. The shorter duration of activities may be affected by weekday time frames, where individuals often possess limited time for social interaction, utilising seating mainly for short breaks throughout their day.

The observed activities highlight the seating's versatility, accommodating quick, practical uses during weekdays and extended, diverse social interactions on weekends. The variety and length of activities highlight the significant role of seating in fostering active social behaviour, depending on the time and context. Moreover, seating that blends aesthetics with functionality fosters social interaction by creating spaces that are not only visually appealing but also practical for users. While decorative designs may add to the visual landscape, they can limit social engagement by focusing more on style than usability, as seen in AG vibrant, where the points dropped from 72 to 62. Therefore, inviting seating designs naturally attract people, creating a welcoming atmosphere that encourages interaction. When seating is overly rigid or decorative, it can restrict how people engage with the space, reducing opportunities for social connection.



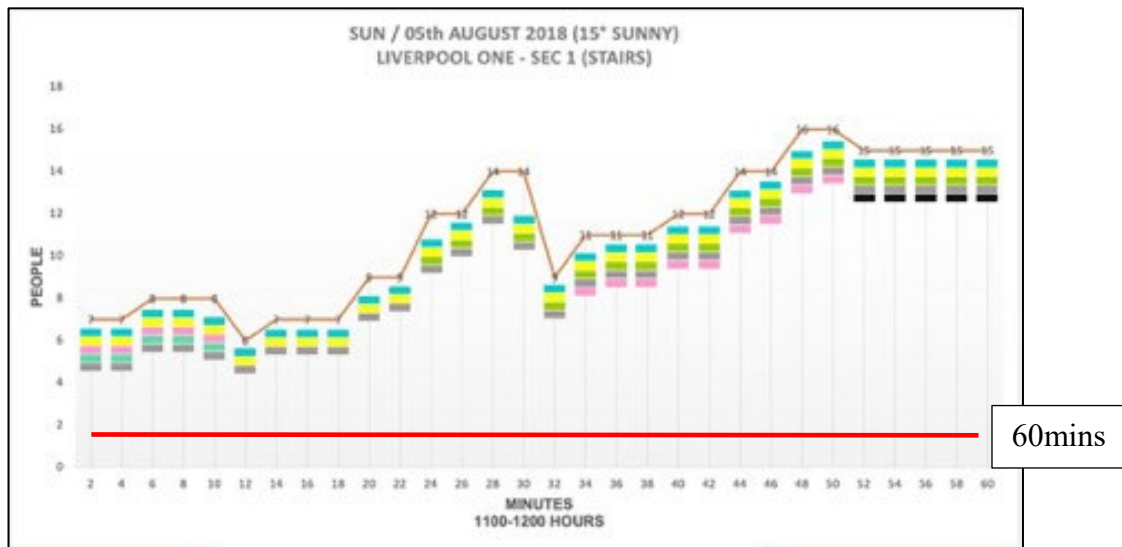


Figure 4-21 and Figure 4-22: Illustrate the most prolonged social activities observed

Users are prone to utilise stair seating for several critical reasons. The perception of safety is crucial, as stairs are typically located in high-traffic areas with adequate lighting and surveillance, instilling a sense of security that encourages people to remain and interact, regardless of the time of day. The visual appeal of stair seating, such as public art, landscaping, and architectural features, enhances the area's overall attractiveness, fostering social interaction and more extended engagement. The strategic placement and flow of stair seating, often along key pedestrian routes or near social hubs, make it a convenient stop for rest and socialising, serving as a natural gathering point. Additionally, stairs offer versatility and adaptability, providing seating options suitable for individuals and groups and supporting diverse social activities. The combination of safety, aesthetic appeal, strategic positioning, and flexible seating increases the popularity of stairs as a space for social interaction.

4.2.2.6 The High-Scoring Seating Designs and User's Favourite (Product and Environment)

The analysis of high-performing seating designs highlights the frequent use of "Stairs Seating" in Liverpool One and "Ramp Seating" in Manchester's Exchange Square. Several factors contribute to these seating designs being both user-preferred and high scorers in the audit. According to auditing studies, these two seating arrangements

appear to promote active behaviour for social sustainability, with factors such as comfort, accessibility, flexibility, and environmental integration playing key roles. These qualities make the seating practical and enjoyable for a variety of social activities. This is demonstrated in walk-by observational studies. It is linked to the number of users using the seat, the different activities that occur, and the time spent at these locations.

- i. **Location placement** is of paramount importance. The "Stairs Seating" in Liverpool is situated in a quieter, secure location, rendering it appealing for individuals seeking to relax in a spacious, pleasant setting. Conversely, "Ramp Seating" in Exchange Square is strategically situated amongst prominent shopping malls, department stores, and a tram station, positioning it within a high-traffic area that inherently attracts individuals for social engagements. Notwithstanding the area's activity, its closeness to covered structures guarantees a pleasant atmosphere, even in summer.
- ii. **The seating configuration** further increases user attraction. The configuration of the "Stairs Seating" promotes social connections, mainly if it includes other street performances. This adaptable seating arrangement accommodates over 20 individuals simultaneously, encouraging community interaction and offering an engaging environment for collaborative tasks. Like a play stage, Manchester's "Ramp Seating" promotes universal accessibility and inclusivity, appealing to diverse users.
- iii. **Environmental elements, such as open space**, enhance the comfort of both seating areas. These designs facilitate comfortable lingering, even in warmer temperatures, so encouraging prolonged social encounters.

In summary, integrating strategic positioning, inclusive design, and environmental comfort makes these high-scoring seating solutions exceptionally effective at fostering social interactions and improving the usability of public spaces.

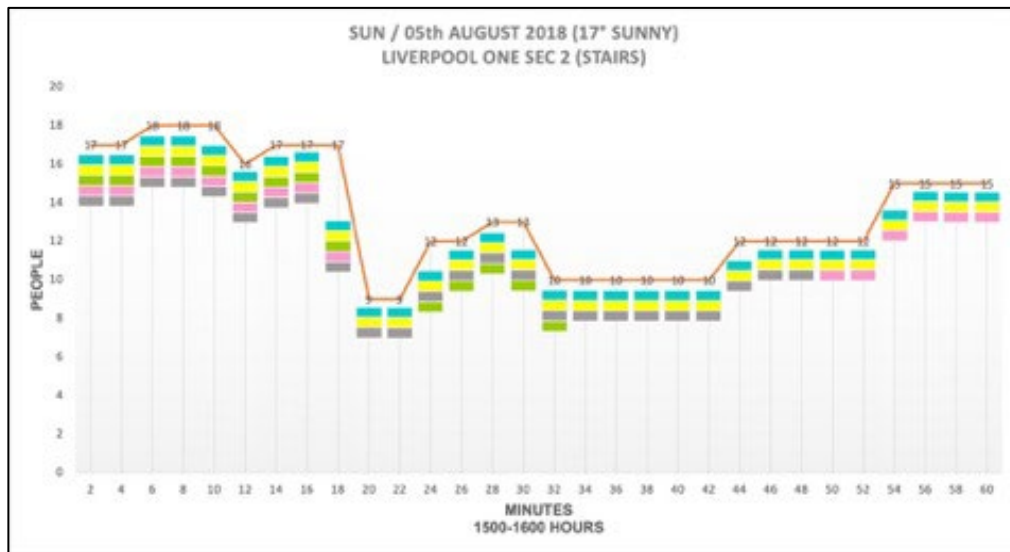


Figure 4-23 The Stairs Seating, Liverpool ONE, Liverpool, August 2018.

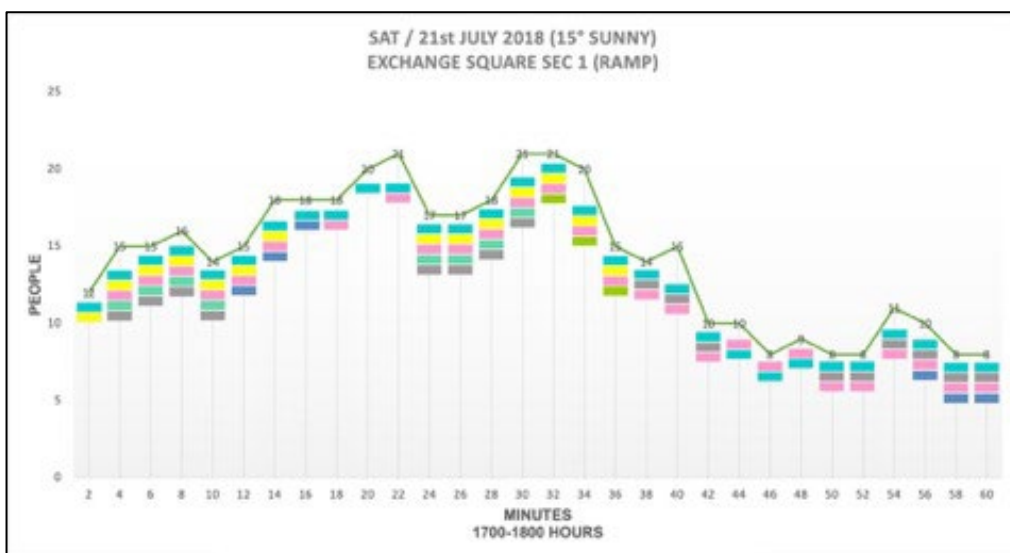


Figure 4-24 The Ramp Seating, Exchange Square, Manchester, July 2018

4.2.2.7 The Mid-Scoring Seating Designs and User's Favourite – The Concrete Seating (Products and Environment)

The research additionally investigates mid-scoring seating designs to assess their potential importance. Chiang et al. (2009) propose that mid-range scores may signify a more sophisticated and feature-rich design accompanied by increased production expenses and extended development periods. This viewpoint is corroborated by Jiang &

Guo (2015), who assert that analysing low and mid-range scores must consider the target market and consumer preferences. A new study on product design indicates that aesthetics, usability, and symbolism significantly influence purchasing intention, word-of-mouth promotion, and price willingness. This indicates that a meticulously designed product with a moderate score may achieve commercial success, provided it corresponds with user requirements and preferences. The scoring data indicates that the Concrete Seating in St Ann's Square scored 50 points, considered mid-scoring. The accompanying graph illustrates how users interact with the seating (see Figure below). Additionally, this study found that the significance of this seating area increases during the weekends.

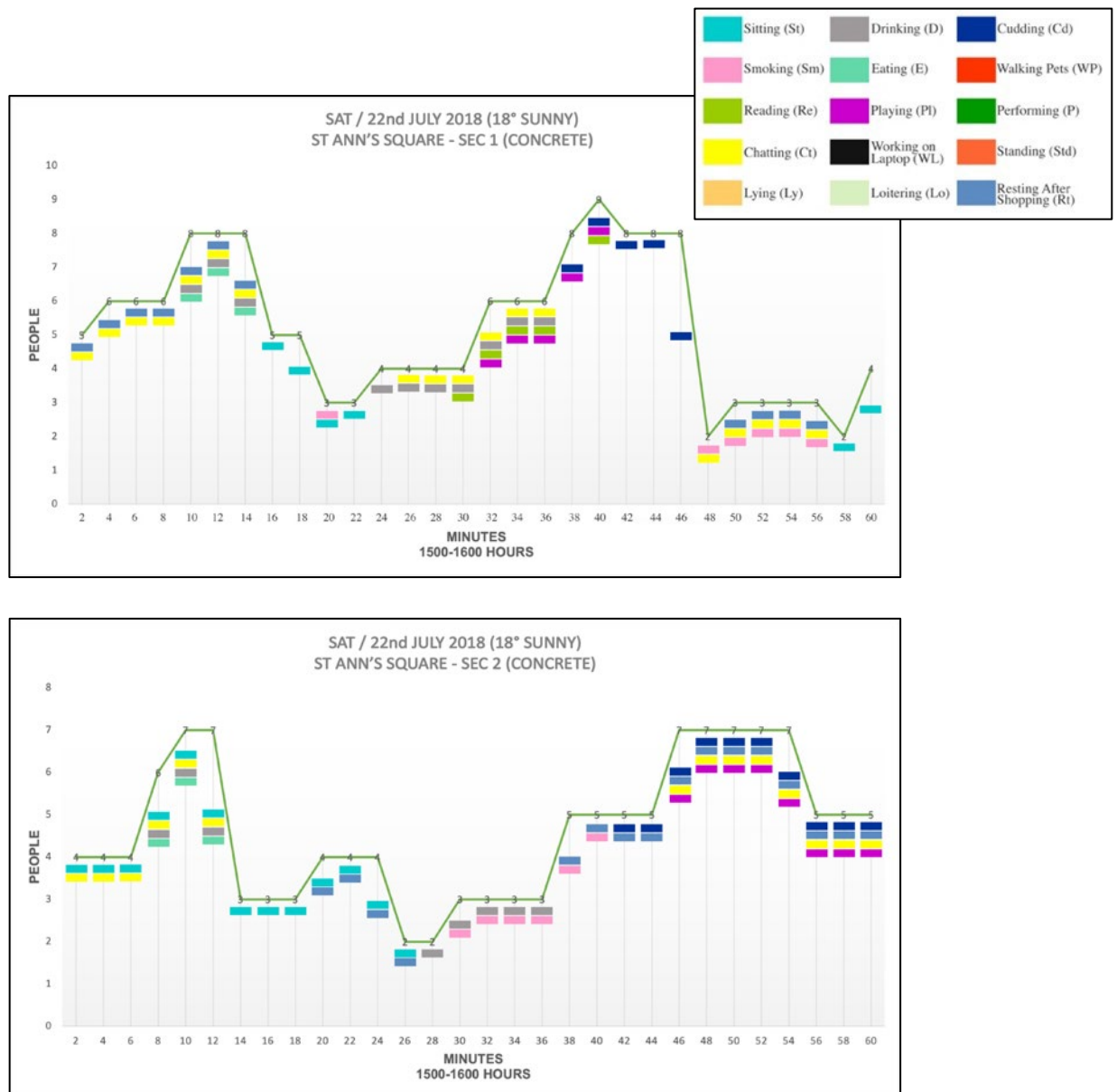




Figure 4-25 – Concrete Seating at St Ann's Square, Section 1 and Figure 4-26 illustrates in Section 2, Manchester July 2018

Section One

The graph for Section 1 of St Ann's Square illustrates fluctuating activity levels throughout a 60-minute interval from 15:00 to 16:00 hours. During the interval from the 2nd to the 10th minute, 6-8 individuals occupy the space, engaging in various activities such as sitting, conversing, and reading. At the 12th minute, a minor decrease to 5 individuals is noted, followed by a gradual increase to 8 individuals by the 38th minute. The interval between 20 and 38 minutes signifies a notable surge, during which most individuals are sitting, reading, or resting post-shopping. After this peak, a decline transpires at about the 42-minute mark, resulting in the user count dropping to 2-3 individuals. A minor revival of activity is observed in the final 10 minutes, with individuals mainly engaged in sitting and reading. Overall, Section 1 exhibited elevated usage peaks, with individuals participating in diverse activities, particularly midway through the observation period.

Section Two

In Section 2, the activity pattern exhibits a distinctly different distribution. The initial count of people using the seating is approximately 4-5 within the first 10 minutes, mainly engaging in chatting while sitting. A significant peak of 7 individuals occurs between the 10th and 14th minutes, followed by a decline in occupancy to as low as 2-3 individuals around the 22nd minute. Activity resumes around the 42-minute mark, with participation increasing to a stable peak of 6-7 individuals engaged in activities such as resting post-shopping, chatting, and cuddling. During the final 10 minutes of the observation, the seating accommodates approximately 5-6 individuals, maintaining moderate utilisation.

Comparative Analysis

Both sections display varying peaks and troughs in activity, with Section 1 demonstrating slightly higher overall activity than Section 2, especially between the 20th and 40th minutes. The activities seen in both groups were notably similar, with sitting, resting, post-shopping, and chatting being the most common.

A key difference between the two areas at St Ann's Square is the timing and frequency of utilisation. At the midpoint of the observation, Section 1 had more users for a longer period. In contrast, Section 2 had modest yet consistent usage in the latter part of the hour. These changes illustrate how different sections within the same square can result in varying degrees of involvement, potentially influenced by seating configurations, sun exposure, or surrounding activity.

The graphs for both Section 1 and Section 2 at St Ann's Square in Manchester, analysed over the weekend, show a variety of activities that contrast markedly with those usually observed on weekdays. The number of individuals occupying the area was significantly higher than on weekdays, indicating more leisurely and sociable weekend activities. The documented activity patterns and frequencies reveal more than five separate types of activities, predominantly encompassing leisure and informal gatherings with family and friends, in alignment with the more relaxed weekend atmosphere. The analysis also suggests that the concrete seating in St Ann's Square holds promising potential to foster user social interaction. The consistent usage patterns and various activities indicate that this seating design successfully encourages community engagement. Its strategic configuration and comfortable environment invite diverse social activities, making it an ideal feature for enhancing public interaction. This potential demonstrates how well-designed public seating can transform urban spaces into vibrant hubs of social activity.

4.2.3 Synthesis of Daytime Data

To complete the daytime observational study, various social interactions and public engagement with street seats were identified at numerous case study locations. Factors such as seating design, placement, environmental comfort, and nearby activities influenced usage during weekdays and weekends. Effective seating designs, such as Liverpool ONE's "Stairs" and Manchester Exchange Square's "Ramp," attracted a

diverse range of users and fostered active social behaviours. During lunch hours and after work, these seating arrangements were mainly used for informal conversation, relaxation, and activities such as reading or resting after shopping.

Thoughtfully placed and designed for comfort and accessibility, street seating boosts social sustainability. The stairs and ramp seating areas were especially popular because their informal arrangement made it easy for groups of various sizes and activities to gather. External factors, such as nearby events, also helped increase space use and foster community involvement.

Therefore, this study extended the observational period beyond regular business hours to evaluate the potential and impact of evening street seating on social interactions at the case study sites. The study believed this extra phase, called "Night Data," lasted 18 hours over four days, from 18:00 to 21:00. Observations ended at 21:00 due to safety concerns, as the researcher was female. Although the focus was on interactions during business hours, this supplementary analysis aimed to explore evening social activity patterns and gather insights into public engagement with street seating. The accompanying graphs show nighttime social dynamics, and conclusions are presented at the end of the study.

4.2.4 Night Data Observation

This study extended the observational timeframe beyond standard business hours to investigate the potential and importance of social interactions facilitated by street seating at the case study locations. A cumulative total of 18 hours, termed "Night Data," was allocated to this extensive study, conducted over four days from 18:00 to 21:00 hours. Due to safety considerations, the observations were terminated by 21:00 as the researcher was female. This research primarily focused on interactions during business hours. In contrast, this extension sought to investigate whether distinct patterns of social activity emerge in the evening, thereby providing a more comprehensive understanding of public engagement with street seats. The data, illustrated in the subsequent graphs, offer insights into how street users engage with seating options during the evening hours and into nocturnal social dynamics. Conclusions were derived after the study.

4.2.4.1 The Bank Holiday Atmosphere

On Monday, 27th August 2018, a bank holiday, Market Street took on a slower, more relaxed pace. The study observed the three-seater benches in Sections 1 and 2, which showed a range of activity between 18:00 and 21:00, but it was clear that the usual weekday rush was absent. From 18:00 to 19:00, some people still used the benches, with peaks of around eight individuals sitting, reading, or resting after a day of shopping, suggesting people were finishing up their day, perhaps waiting for public transport or taking a final breather before heading home.

The numbers gradually dipped as the hour passed, with people trickling away to catch their buses or trains. By 19:00 to 20:00, things had slowed down even further, with only a few individuals seen sitting or chatting briefly on the benches, the general vibe much quieter, and the streets starting to empty as most people had already made their way home or were winding down elsewhere. Between 20:00 and 21:00, the seating was almost entirely unused, with only a few stragglers popping in to sit briefly, the benches mostly empty, and the day's energy clearly fading, with most people already indoors, wrapping up their bank holiday.

Overall, the bank holiday evening brought a very relaxed atmosphere to Market Street, with people in no rush and most either heading home or already leaving the area; the street seating reflected this, not as actively used as it might be on a regular weekday.

Conclusion: In this scenario, social interaction was minimal, with the seating vastly underutilised as people moved towards private spaces, indicating the influence of time and occasion on public social engagement. The relaxed environment reduced the need for social interaction through street seating, demonstrating how external factors, such as holidays and time of day, shape public spaces' role in fostering community and interaction.

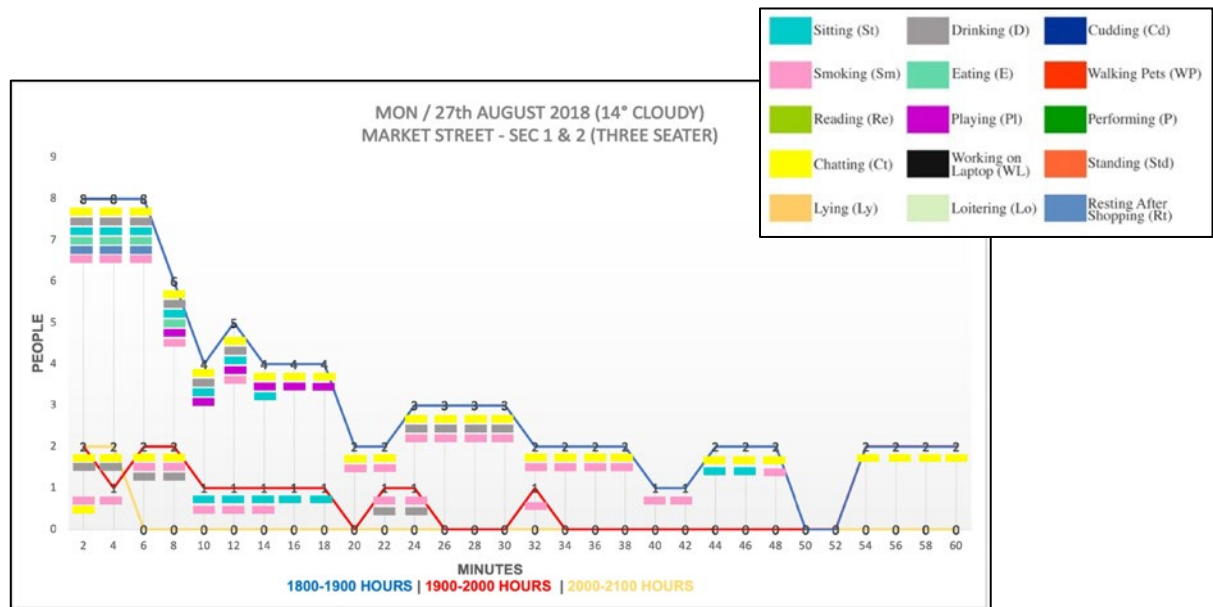


Figure 4-27 - Market Street (Bank Holiday) - Three-Seater Seating

4.2.4.2 The High-Traffic Urban Corridor

As the evening progressed at Exchange Square on a cloudy Tuesday, the ramp seating area reflected the city's gradual transition from the busyness of the day to the quieter evening hours. Between 18:00 and 19:00 (blue), a steady stream of people used the seating, with as many as 14 individuals occupying the space at its peak. People were observed sitting, reading, chatting, or simply resting after a day of work or shopping. The graph shows the mix of activities as people paused momentarily in this central area, likely catching their breath before continuing their journey home or perhaps waiting for public transport. The space remained relatively active for the first part of the evening. As the clock approached 19:00, the scene changed (red). Fewer people were using the seating, and by the 10th minute of the hour, the area became noticeably quiet, with no one using the seats for the remainder of the hour. It was clear that most people were either hurrying to catch buses or trains or heading straight home after work, leaving the public seating largely unused. From 20:00 to 21:00 (yellow), the seating area remained calm, with only a couple of people sitting down, either resting or perhaps waiting for their ride home. The lively pace of earlier hours gave way to the stillness of the evening, with only a few passersby walking through the area, possibly returning from late shifts or grabbing something to eat before heading home.

This quiet period in the later hours suggests that the seating, while serving as a practical resting point earlier in the day, was less frequented as people wrapped up their daily routines, catching public transport or making their way home after a long day. The passing crowds earlier in the evening gave way to a more subdued scene, reflecting the city's natural ebb and flow. The evolving use of the seating area over these hours showcases how public spaces in urban settings can transition from bustling hubs to quiet, underused spaces as daily routines come to an end. Public seating, while essential earlier in the evening, becomes less relevant as people move towards private spaces or transportation to wrap up their day.

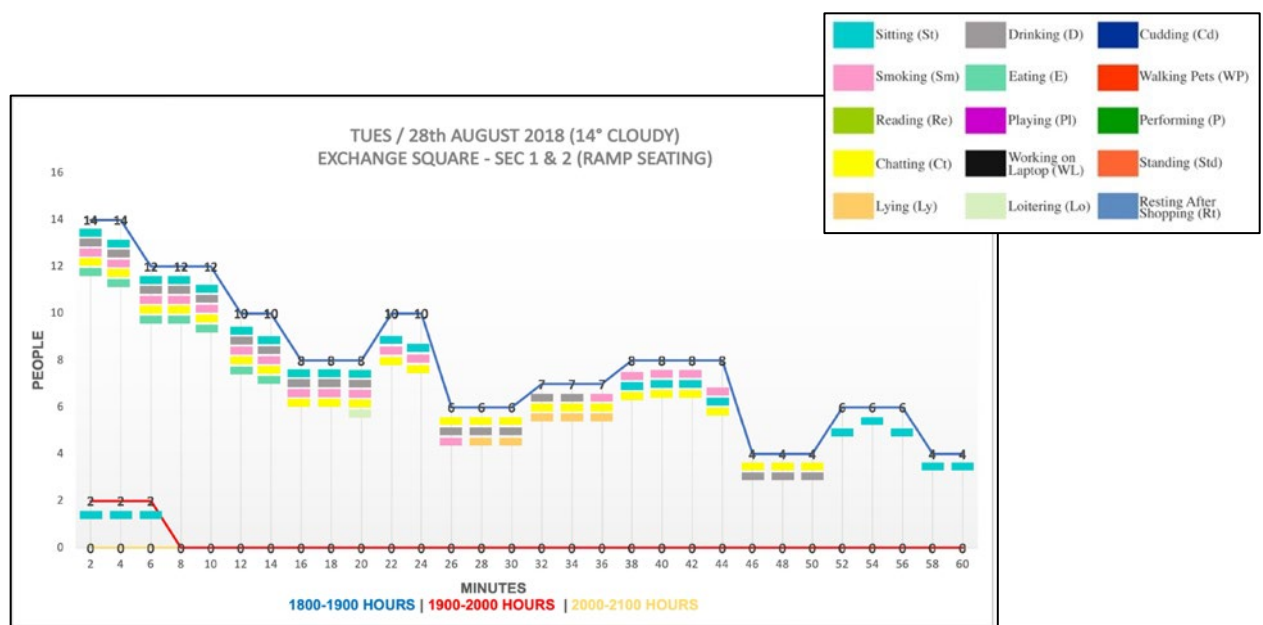


Figure 4-28 - The Ramps (The High-Traffic Urban Corridor)

4.2.4.3 The Lowest Score Design

The following graph illustrates the activities observed at St. Ann's Square (Concrete, Stone Ball & Metal Seating) on Wednesday, 29th August 2018. Despite being a lower-scoring design, the seating still facilitated a variety of activities, with peaks during the early evening (18:00-19:00) and after 20:00 hours. Activities like sitting, chatting, and resting after shopping were the most common. Like other areas, as the day progressed, people gradually started to leave, and the space began to quieten. By the end of the observation period, the area was nearly vacant, signalling the close of the day. This

pattern may indicate that while the design might not be optimal, the location and timing still attract users seeking respite or social interaction. The findings suggest that even with suboptimal design, strategic placement and timing can contribute to the vibrancy of public spaces. Despite the suboptimal design of the seating at St. Ann's Square although some may not represent, however materials like concrete, stone, and metal, the space still managed to facilitate social interactions, such as sitting, chatting, and resting after shopping. The peak usage observed between 18:00 and 19:00 and another uptick after 20:00 suggests that while users found value in the seating, its design did not fully support prolonged or active social behaviours.

The lack of inviting features—such as ergonomic considerations or aesthetic appeal—likely contributed to the space being less utilised as the evening wore on. The uninviting materials and rigid design could discourage extended stays, limiting the space's potential for vibrant social engagement. Furthermore, while strategic placement and timing played a role in attracting users, the design's shortcomings may have prevented the seating from becoming a true hub of social activity. This pattern underlines the importance of considering not only location but also materials, comfort, and aesthetic appeal when designing public seating to promote dynamic and sustained social interaction.

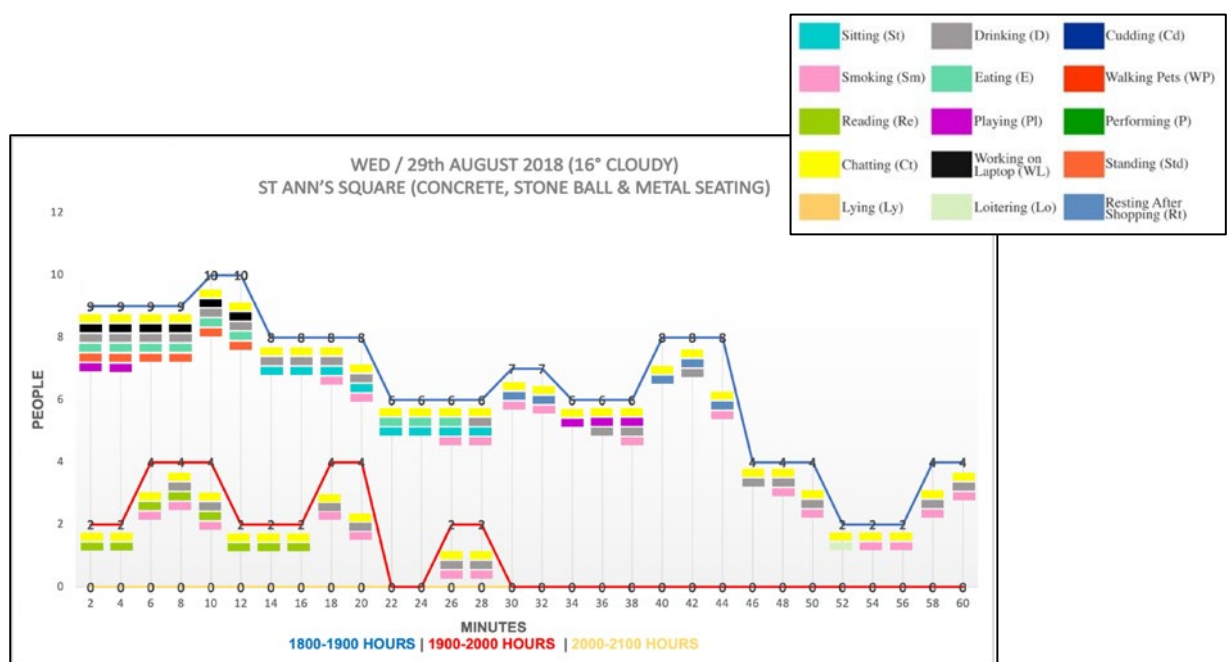


Figure 4-29 - The Lowest Scores of Design Seating

4.2.4.4 Comparison of Strategic Location

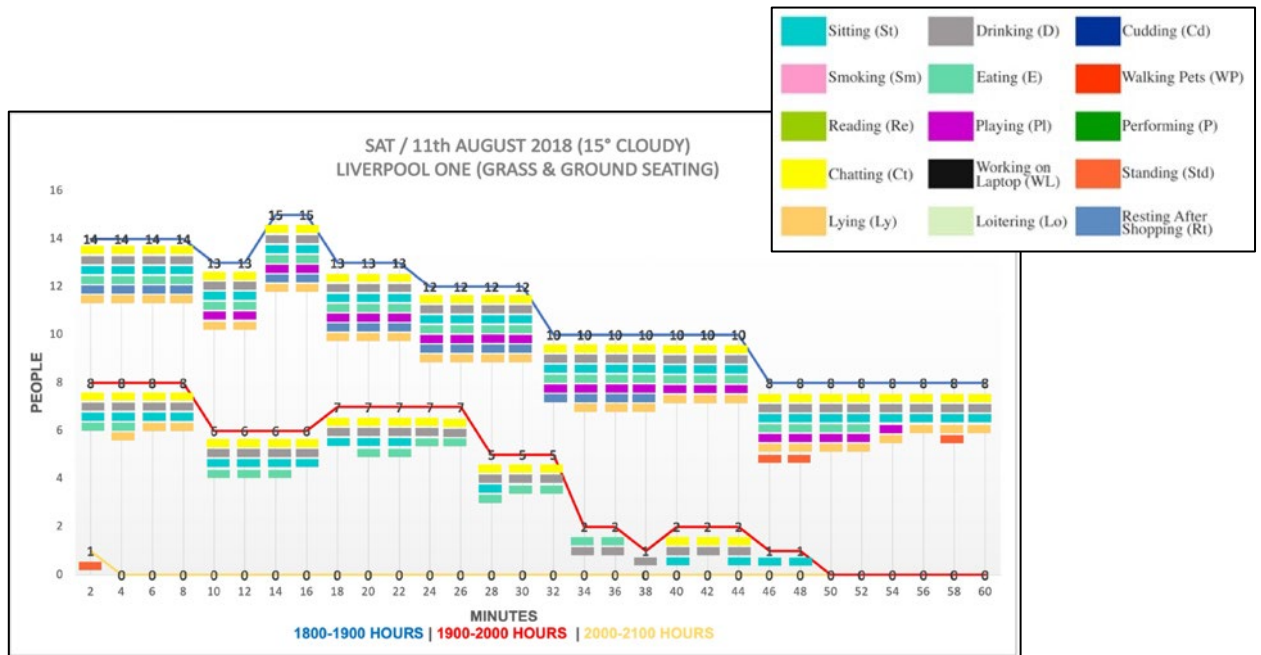


Figure 4-30 - Grass and Ground Seating (Welcoming Atmosphere)

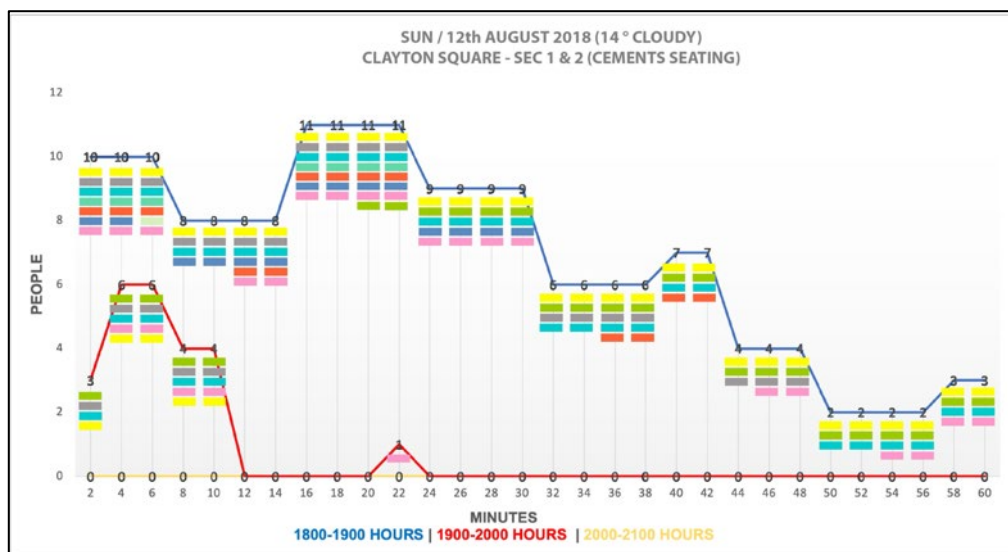


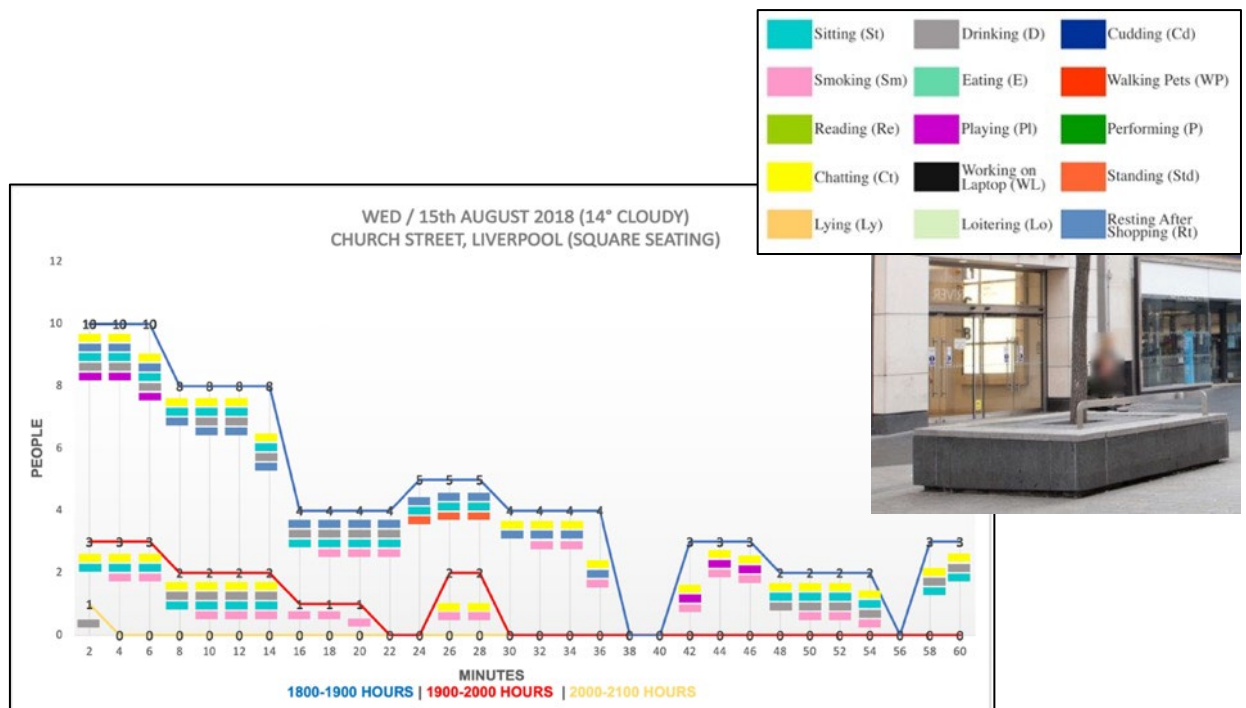
Figure 4-31: Figure Clayton Square (Quite Place)

The comparison between the grass seating at Liverpool ONE and the cement seating at Clayton Square underscores the critical influence of location and safety on social interaction in public spaces. The grass seating in a highly strategic location experienced higher activity levels throughout the observation period, particularly between 18:00 and

19:00. This suggests it is a preferred spot for leisure activities such as sitting, chatting, and resting after shopping. In contrast, while the cement seating at Clayton Square was utilised, activity declined notably after 19:00.

The primary social interaction keywords observed in both areas were sitting, resting after shopping, and chatting, indicating that these spaces were predominantly used for casual interactions. This decline in social interaction as night falls highlights the challenges public spaces face in balancing usability across different times of day. Although the grass seating at Liverpool ONE and the cement seating at Clayton Square effectively promote social behaviour during daylight hours, their appeal significantly diminishes after sunset. Factors such as poor lighting and safety concerns deter users from lingering in these areas, despite their prime locations. This indicates the need to consider not only the design and location of street seating but also the elements that ensure comfort and security at every hour. With improved lighting, shelter, and maintenance, these spaces could extend their capacity for social engagement beyond daylight hours, fostering a more inclusive and active social environment throughout the day.

4.2.4.5 Usage Patterns of Pedestrian Walkway Seating Between Shopping Malls and Transport Hubs – Evening Views Activity at Church Street, Liverpool.



This graph represents seating placed between shopping malls and public transport stations, along a pedestrian walkway at Church Street, Liverpool. The seating area is in a high-traffic zone, supporting various types of activities throughout the day and evening. Observation from 18:00 to 19:00 hours: the number of people occupying the seating steadily declines from an initial 10 to about 6 by the 20th minute, engaging primarily in sitting, chatting, and reading. The variety of activities reflects the transitional nature of the space, with individuals stopping briefly between commuting or shopping. However, the number of users decreases sharply after the 30-minute mark, and during the period from 19:00 to 20:00, only a few individuals remain engaged, with activities predominantly focused on resting post-shopping or sitting.

The night-time data between 20:00 and 21:00 show a further reduction in social activity, with only 2–3 individuals using the seating sporadically. This is likely due to the reduced footfall after the shops and public transport hubs begin closing for the day. Overall, the seating is well-positioned at its strategic location between key urban nodes, offering a practical resting place for pedestrians. However, the activity level tends to taper off in the evening, likely due to fewer people commuting and the general decline in social engagement during later hours.

4.2.5 Summary of The Observation Data

This investigation highlights the significant impact of street seating design on social behaviour in urban spaces. Daytime data consistently shows that thoughtfully designed seating areas, such as the stairs at Liverpool ONE and ramp seating at Exchange Square, encourage social interactions and longer visits, especially during business hours when people engage in activities like resting, chatting, or reading. These designs offer adaptability and comfort, making them ideal for fostering active social interactions and community involvement. Additionally, showing that ramp seating attracts more visitors than other types suggests that the design should favour a more open space style.

This study primarily focused on activities during business hours; however, it was hypothesised that midnight data could indicate prolonged social activity. Nonetheless, the nocturnal data from all case study locations indicated a saturation limit, beyond which social engagement markedly declined. Numerous seating areas were rarely used

post-19:00, and by 21:00, few individuals were observed remaining or mingling. This may be due to safety concerns, insufficient illumination, or the natural decline in public activity after working hours, resulting in reduced public interaction with street seats at night. Also, there are social events, but they are more about standing in a group while drinking or smoking, and it is rare to see them sitting.

Improvement in ergonomic design, understanding diverse usage patterns, and integrating features that facilitate social interactions during both day and night can contribute to the creation of sustainable public seating solutions. These efforts align to foster active social behaviour through thoughtfully designed urban environments. Still, it remains clear that nighttime social activities are more limited and might require additional considerations to thrive.

4.2.6 Summary of the Observation data with the main themes of this research study namely People, Space and Product

[PEOPLE]

The study highlights that street seating serves not only as a resting point but also as a catalyst for social engagement, which is a key component of active behaviour for social sustainability. Most social activities occurred during "happy hour" after office hours, starting around 16:30, with people spending time with family and friends, regardless of age. These interactions help foster social cohesion and a sense of community, which are vital for sustainable urban environments. The data support the view that well-designed, accessible seating encourages active participation in public spaces, contributing to the broader goal of social sustainability by creating spaces where people of all demographics feel welcome and comfortable to interact. Universal design principles are essential to ensure inclusivity and foster long-term social engagement.

[SPACE]

Observations conducted on weekends and holidays revealed a wider range of activities, often organised in collaboration with city councils or private companies for events such as public awareness campaigns. Though 15 sites were studied, only a few were selected for these activities, underscoring the strategic importance of location in making certain

seating areas more active. Different seating arrangements met varied public expectations, suggesting that designs should accommodate behavioural patterns that encourage gathering, lingering, and social interaction. These findings highlight the need for innovative designs that support responsive and socially inclusive public spaces, reinforcing the development of democratic and equitable urban environments.

[PRODUCT]

Street seating was frequently fully occupied, especially during weekends, indicating the need for additional seating in high-demand areas such as Market Street and Exchange Square. While expanding seating options may require funding, this can be mitigated by selecting durable and cost-efficient materials. Moreover, creating seating spaces specifically designed for children could foster more diverse and active social interactions. The study also identified poorly maintained street furniture, highlighting the need for regular maintenance and refurbishing to enhance the overall usability and appeal of these public spaces.

4.3 Survey Findings Data

This section discusses the findings from a quantitative survey investigating how users perceive social behaviour through street seating design. In addition to understanding users' views on social behaviour, the study aimed to explore how social behaviour relates to street seating design. The survey inquired about users' preferences, familiarity with the environment, and their opinions on the environment and street seating designs. Moreover, these surveys were conducted to fulfil the second and third objectives of this research. The table below outlines the format of the questionnaire.

Item	Question	Themes
Q1	Times Spent	People
Q2	Hours Spent	Space
Q3	Purpose of Spending Time	People and Space
Q4	Environment Satisfaction	Space
Q5	Street Furniture Design with Surrounding	Product
Q6	Overall Street Furniture Design with Environment	Product / Space
Q7	Likely Using Street Furniture Provided	Product
Q8	Street Furniture Commonly Used	Product
Q9	Respondents Explain	People
Q10	Specific Activities while using Street Furniture	People
Q11	Likely Communicate with Stranger	People
Q12	Future Suggestions	Product / Space

Table 4-5: Questionnaire Formation

As illustrated in Table 4.6, the author structured the questionnaire around three themes: Product, People, and Space. These themes represent the three essential aspects of a sociable street (Mehta, 2013). Specifically, they encompass social aspects (Space), behavioural aspects (People), and physical aspects (Product).

Sustainability's social dimension is particularly neglected, even though it is the most crucial aspect for developing active social behaviours (Boström, 2012). Space is what people seek—a place where they can see and meet friends, neighbours, or strangers to spend their free time and engage in various activities. Past studies have shown that one of the most critical characteristics for fostering socially active living is the behavioural aspect (Lilley, 2007; Mehta, 2013; Niedderer et al., 2016). This behavioural aspect depends on the type and nature of use and can only be observed through "people."

Finally, the third aspect that supports community life is the physical characteristics of the environment, including the road, adjacent buildings, and surrounding products. This physical aspect is represented by the product. The structure of this questionnaire is

designed to guide the research towards obtaining the best data through thoughtful responses. The data presented range from the first to the last question, demonstrating the significance of each analysis and the importance of even the smallest questions to the overall research objectives.

4.3.1 Data Findings

4.3.1.1 Time

The first question in the survey was *"How often do you come to this place?"* and below is the result of the data collected.

Variable	Manchester *90		Liverpool *100	
	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
Every day	29	32.2	6	6.0
At least Once A Week	17	18.9	26	26.0
A Few Times A Month	17	18.9	14	14.0
Monthly or Less	27	30.0	54	54.0

Table 4-6: Comparing the frequency spent in both observed places

As shown in Table 4.6, the frequency of visitors who came to Manchester "Every Day" is higher at 29% compared to other variables. However, this result contrasts with the Liverpool site, where "Every Day" holds only 6%, the lowest among the variables. Instead, the highest frequency for Liverpool is "Monthly or Less," with a significant percentage of 54%.

The second highest frequency of spending time at the sites in Manchester is "Monthly or Less" at 27%, followed by 17% for both "At Least Once a Week" and "A Few Times a Month." In Liverpool, the second highest frequency is "At Least Once a Week" at 26%, followed by "A Few Times a Month" at 14%, with "Every Day" being the least frequent.

4.3.1.2 Hours

The tables below describe the amount of time people spend when visiting the mall. Two tables are presented for both case study sites: Manchester and Liverpool.

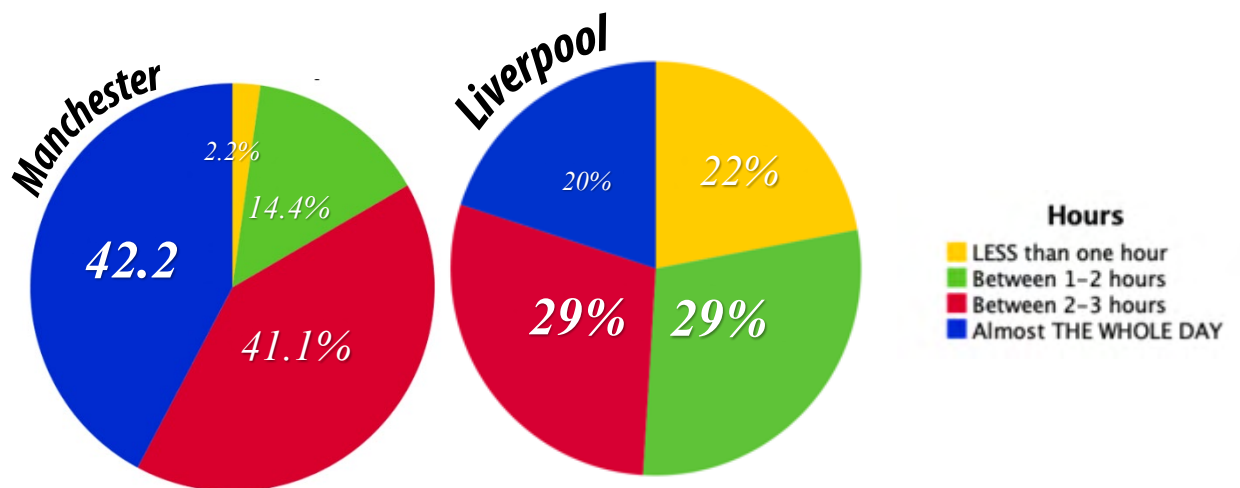


Figure 4-32 Chart count on hours spent in both Manchester and Liverpool

As shown, the charts for Manchester and Liverpool display entirely different results. In Manchester, the highest percentage of respondents, at 41.1%, reported spending "Between 2-3 hours" at the mall, closely followed by those who spend "Almost the Whole Day." The remaining two categories have significantly lower percentages.

In contrast, Liverpool's results show that the most common durations for mall visits are "Between 1-2 hours" and "Between 2-3 hours," each with 29% of respondents. This is followed by 22% of respondents who spend "Less than one hour" at the mall and 20% who spend "Almost the Whole Day."

4.3.1.3 Purposes of Spending Time

Question three inquired about the purpose of spending time while visiting the mall, offering four answer choices, with an option for respondents to provide other answers if their purpose differed from the given selections. The results for both sites are as follows:

	Manchester *90		Liverpool *100	
Variable	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
Shopping	35	38.9	54	54.0
Hanging out with friends and/or family	56	62.2	56	56.0
Having Time to Myself	22	24.4	24	24.0
Working	60	66.7	14	14.0

**participants*

Note: Respondents are allowed to select more than one answer

Table 4-7: Purpose of visiting the malls

The table above compares data from the two cities, Manchester and Liverpool. Each data set was processed separately using SPSS before being combined in the table for comparison purposes.

In Manchester, 66.7% of respondents reported spending their time at the sites "working," making it the highest-ranking activity in Manchester. In contrast, only 14% of respondents in Liverpool selected this option, where it ranked the lowest among other variables.

In both cities, 56 respondents indicated that they preferred "hanging out with friends and/or family." This option ranked second in Manchester, representing 62.2% of respondents. In Liverpool, it was the highest-ranking activity, with 56% significance. This was closely followed by 54% for "shopping" and 24% for "having time to myself."

In Manchester, the following highest activities were "shopping" at 38.9% and "having time to myself" at 24.4%, similar to the percentages in Liverpool. Additionally, 11 respondents (Ten from Liverpool and one from Manchester) selected "Others." Table 4.8 below provides a breakdown of the "Others" category for both case studies.

	Manchester *90		Liverpool *100	
Variable	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
Drinking			1	1.0
Group Session			1	1.0
Holiday			1	1.0
Museums			2	2.0
Travelling			5	5.0
Pass by	1	0.9		

*participants

Table 4-8: Other Selection Purpose of Visiting the Mall

This data confirms that Manchester had the most respondents visiting the mall for work, while Liverpool had fewer. Only one person from Manchester said, "passing by," whereas ten from Liverpool selected "other" and explained their reasons.

4.3.1.4 Sites Environment Satisfaction

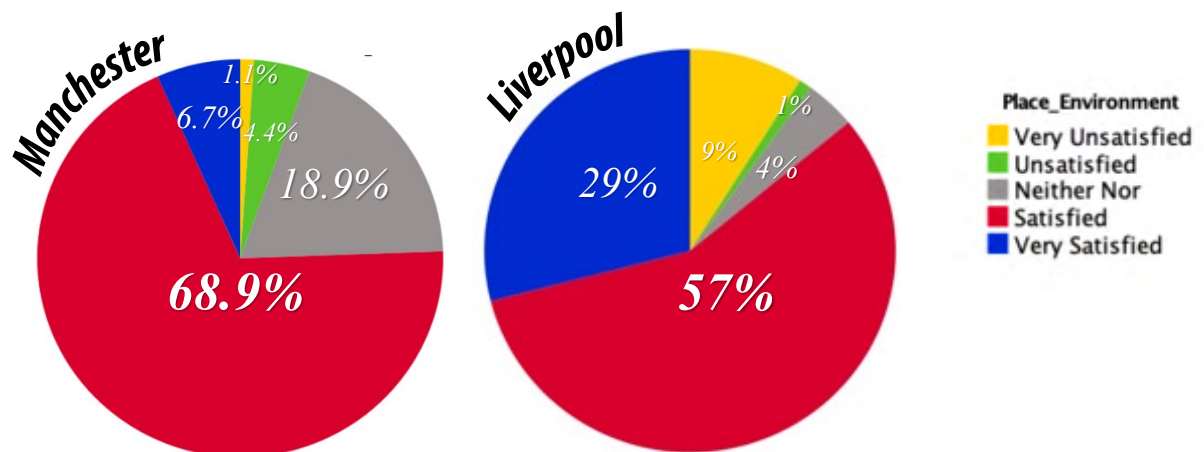


Figure 4-33 Comparison of sites Environment Satisfaction

Figure 4.33 compares site Environmental Satisfaction between the two study locations. Significantly, both charts show that "satisfied" is the highest category selected, with 68.9% for Manchester and 57% for Liverpool.

In Manchester, the lowest rate was 1.1% for the "very unsatisfied" category, while in Liverpool, it was 1% for "unsatisfied." Other ratings for Manchester were 18.9% (neither-nor), 6.7% (very satisfied), and 4.4% (unsatisfied). In Liverpool, 29% rated "very satisfied" as the second highest, followed by 9% "unsatisfied" and 4% "neither-nor."

4.3.1.5 Street Furniture design suitability in relation to surrounding buildings.

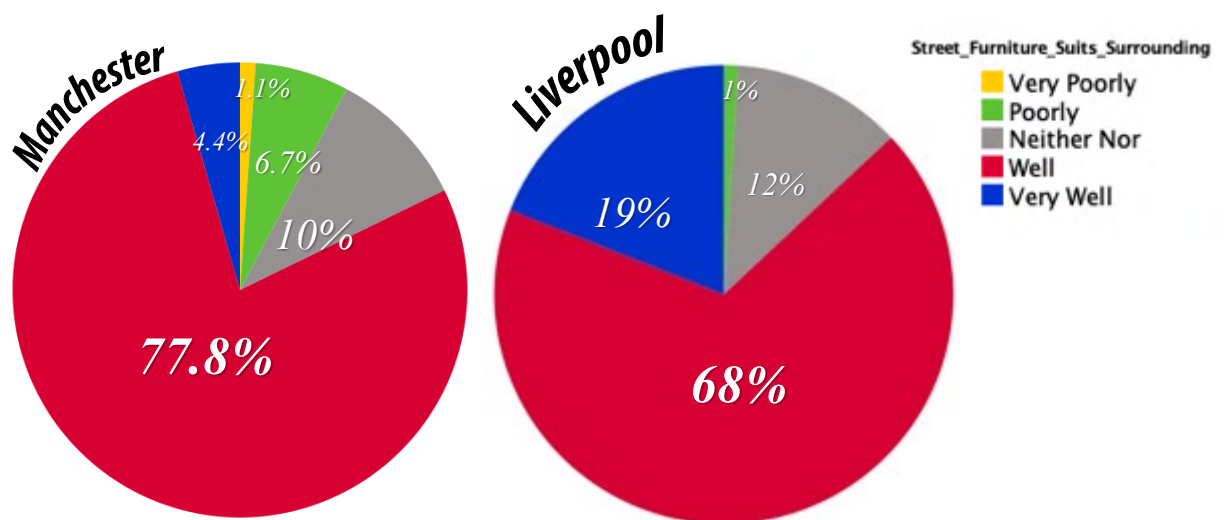


Figure 4-34 Comparison of street furniture design suitability with surrounding buildings

In Figure 4.34, approximately 77.8% of respondents in Manchester and 68% in Liverpool agreed that the street furniture in their respective areas was "well-maintained." Additionally, in Liverpool, about 19% of respondents chose the "very well" option, making it the second-highest rating. This indicates that the street furniture in Liverpool is generally meeting the quality expectations of its visitors. However, about 12% of respondents were still unsure ("neither-nor"), and only 1% rated it as "poorly," with none selecting "very poorly."

In contrast, the second-highest rating in Manchester was "neither-nor" at 10%, indicating some uncertainty among respondents about the condition of street furniture in Manchester. The remaining ratings were 6.7% for "poorly," 4.4% for "very well," and 1.1% for "very poorly."

4.3.1.6 Street Furniture design suitability with the environment

After assessing the suitability of street furniture with its surroundings, the survey further explored its compatibility with the broader environment. The chart below illustrates the results for both Manchester and Liverpool, as obtained from the SPSS data analysis.

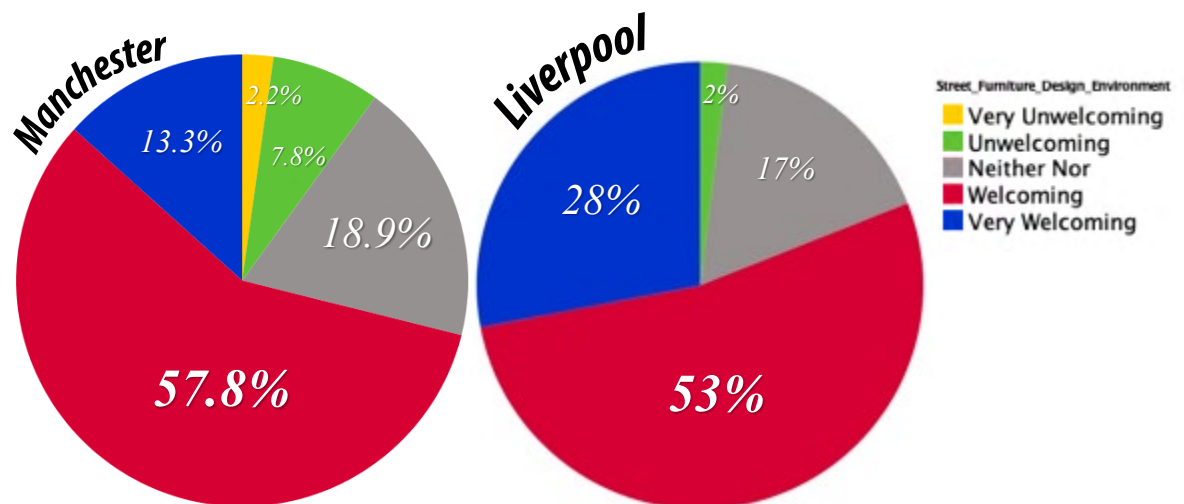


Figure 4-35 Comparison of Street Furniture suitability with Manchester and Liverpool environment

The pie chart above shows that both Manchester and Liverpool have a significant percentage for the "Welcoming" option, with 57.8% for Manchester and 53% for Liverpool. Figure 4.35 indicates that more than half of respondents overall rated the street furniture as "Welcoming," aligning with the significant findings from the previous figure.

Among the other options, "Neither-nor" and "Very Welcoming" were also highly rated. In Manchester, the second-highest rating was "Neither-nor" at 18.9%, while Liverpool

recorded 17% for the same category. However, in Liverpool, the second-highest rating was "Very Welcoming" at 28%, compared to Manchester's third-highest rating of 13.3%.

The "Unwelcoming" option was rated by 2% of respondents in Liverpool and 7.8% in Manchester. For the "Very Unwelcoming" option, Liverpool recorded a zero figure, while Manchester had 2.2%, following a similar pattern to that seen in Figure 4.36.

4.3.1.7 Likely using Street Furniture

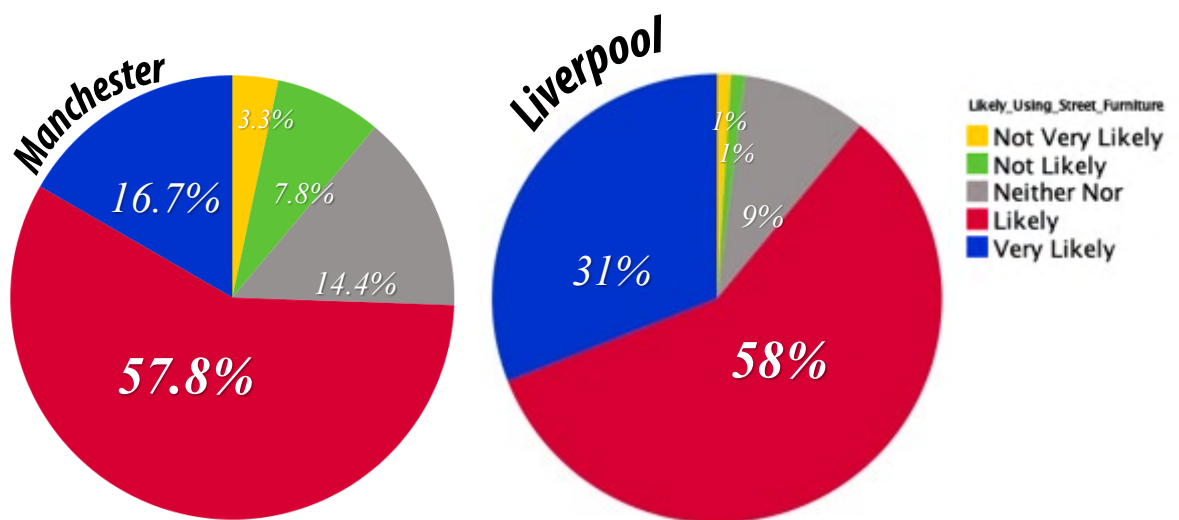


Figure 4-36 Comparison of both sites' visitors who were likely using the street furniture provided

This question was asked to obtain data on how likely users are to use the street furniture provided in the areas. The chart indicates that both Manchester and Liverpool scored well for the "Likely" and "Very Likely" categories. More than 50% of respondents selected "Likely," with 57.8% for Manchester and 58% for Liverpool.

In Manchester, the response sequence was as follows: "Very Likely" (16.7%), "Neither-nor" (14.4%), "Not-Likely" (7.8%), and "Not Very Likely" (3.3%). The gap between "Very Likely" and "Neither-nor" was only about 2.3%, with a frequency difference of just two people.

In contrast, the Liverpool data showed a significantly higher percentage for "Very Likely" at 31%, and a much lower percentage for "Neither-nor" at 9%. The remaining options were rated much lower, as shown in the pie chart. In Manchester, 7.8% rated "Not-Likely" and 3.3% rated "Not Very Likely," while in Liverpool, both of these options were recorded at 1% each.

4.3.1.8 Street Furniture commonly used by the respondents

Variable	Manchester *90		Liverpool *100	
	YES (%)	NO (%)	YES (%)	NO (%)
Benches	61.1	38.9	71	29
Bicycle Racks	11.1	88.9	13	87
Seating with Table	21.1	78.9	48	52
Telephone	2.2	97.8	5	95

**participants*

Note: Respondents are allowed to select more than one option

Table 4-9 : Commonly used Street Furniture based on the given options

To examine which types of standard street furniture were used by respondents in this district, four categories were included in this survey: benches, bicycle racks, seating with tables, and telephones. Table 4.9 above presents the results for both case study locations. The findings show that only a quarter of the street furniture options received high ratings, while the rest had significantly lower ratings. The most highly rated option was "benches," with 61.1% of users in Manchester and 71% of users in Liverpool choosing this option.

The other three types of street furniture were predominantly rated "NO," with the highest "NO" response being for "telephone." Manchester respondents rated telephones as 97.8% "NO," and Liverpool respondents rated them as 95% "NO." This was followed by "bicycle racks," where Manchester and Liverpool had similar "NO" ratings of 88.9% and 87%, respectively. The third type, "seating with tables," also received low ratings, with 78.9% "NO" in Manchester and 52% "NO" in Liverpool.

Additionally, participants were not restricted to the provided options; 29 respondents selected "Other" and specified the types of street furniture they commonly used at the sites. The following table exemplifies these specific types of street furniture.

	Manchester *90		Liverpool *100	
Variable	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
Desk Chair			1	1.0
Grassy Spaces			2	2.0
Stairs	5	5.5	5	5.0
The Arch	2	2.2	1	1.0
Ramp	11	12.1		
The wheelers	1	1.1		
Open Spaces			1	1.0

**participants*

Table 4-10: "Other" options provided by users

The respondents identified seven other types of street furniture, as shown in the table above. Most of the answer choices correspond to the street furniture available in the area. For instance, "Ramp" was the most popular choice in Manchester, and "Stairs" was the most popular choice in Liverpool. This indirectly validates the highest scores from the audited table in the observation session. "Stairs" was also one of the best choices for Manchester, with approximately 5.5%, making it the second-most selected option.

Other choices, such as "Desk Chair," "Grassy Spaces," "The Arch," "The Wheelers," and "Open Spaces," were selected by only about 1-2% of respondents in both Manchester and Liverpool. This question helped explain the participants' responses to the previous questions.

In the meantime, Table 4-11 below demonstrates the respondents' reasons for choosing particular seating during the survey. The most common reason given by respondents from both sites was "Rest / Take a Break," with 12.1% for Manchester and 11% for

Liverpool. This was followed by 3% who selected "Do not Like / Not Using," and 2% for categories such as "Free and Welcoming," "Benches Design Too Small for Big Group," and "Hanging and Lingerin." Lastly, "Photographing" was rated by only 1% of respondents

	Manchester *90		Liverpool *100	
Responses	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
Rest / Take a Break	11	12.1	11	11.0
Free and Welcoming	2	2.2	2	2.0
Not Using / Do not like	3	3.3	2	2.0
Benches too small for a big group	2	2.2		
Hanging / Lingerin	2	2.2		
Photographing			1	1.0

**participants*

Note: This is an open question linked to both Tables 6 & 7

Table 4-11: Responses from Respondents

4.3.1.9 Specific Activities While Using Street Furniture

The next question aimed to identify users' specific activities while using street furniture. In addition to the "Other" category, the survey form provided four options: "Meeting," "Eating / Drinking," "Lingerin / Hanging out," and "Smoking." Table 4.12 displays the results from both Manchester and Liverpool. The results align with the findings from the observation session, indicating that these activities were the primary ones observed during the study.

Variable	Manchester *90		Liverpool *100	
	YES (%)	NO (%)	YES (%)	NO (%)
Meeting	6	84	35	65
Eating / Drinking	47	43	51	49
Lingering / Hanging out	31	59	50	50
Smoking	48	42	12	88

Table 4-12: Specific Activities while using Street Furniture

"Meeting" was the least popular activity in Manchester, with only 6% of respondents choosing it, while in Liverpool, the least popular activity was "Smoking," at 12%. Interestingly, the percentage for "Smoking" in Manchester contradicted Liverpool's results, as it was highest at 48%. This was followed closely by "Eating / Drinking" at 47% and "Lingering / Hanging out" at 31%.

In Liverpool, the highest-rated activity was "Eating / Drinking," at 51%, followed by "Lingering / Hanging out" at 50% and "Meeting" at 35%. Additionally, seven respondents opted for "Other" activities. The results derived from these responses are shown in Table 4-13. A few people selected "Other," with responses including "Hanging out" (3% in Liverpool), "Watching people" (1% in each city), and "Break" (1% in each city).

Responses	Manchester *90		Liverpool *100	
	Frequency	Percentage	Frequency	Percentage
	(Respondent)	(%)	(Respondent)	(%)
Hanging outs with friends and family			3	3.0
Watching people	1	1.1	1	1.0
Break	1	1.1	1	1.0

Table 4-13: "Other" option responses

4.3.1.10 Likely Communicate with Strangers

The tenth question asked respondents, "How likely are you to communicate with a stranger?" Five options were provided for this question, and Figure 4.37 illustrates the results.

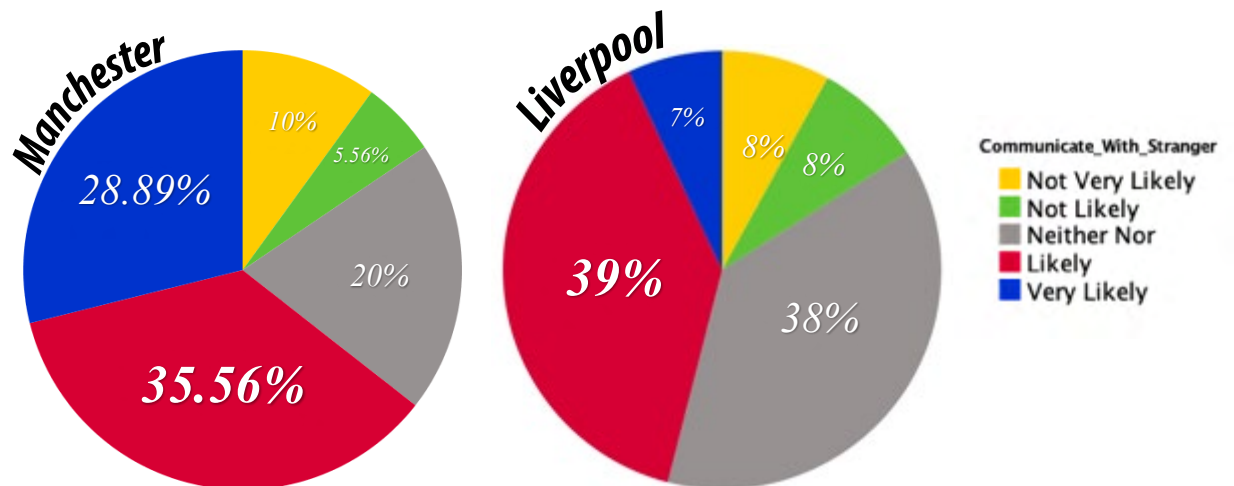


Figure 4-37: Likely Communicate with Strangers

Both Manchester and Liverpool respondents selected "Likely" as the most common response when asked whether they communicate with strangers, with this option scoring the highest among all the other choices. Liverpool scored 39% for "Likely," while Manchester scored 35.56%.

In Liverpool, the second-highest response was "Neither nor," at 38%, just 1% less than "Likely." In contrast, Manchester's results showed "Very Likely" as the second-highest, with a percentage of 28.89%. This was followed by "Neither nor" at 20%, "Not Very Likely" at 10%, and "Not Likely" at 5.56%.

For Liverpool, the remaining responses were 8% for both "Not Very Likely" and "Not Likely," and the lowest rating was 7% for "Very Likely."

4.3.1.11 Future Suggestion

The eleventh question was a subjective inquiry asking respondents, "What future suggestions can you give?" As anticipated, many respondents had opinions on this question. The table below categorises all the suggestions for clarity and formality in the report.

	Manchester *90		Liverpool *100	
Responses	Frequency (Respondent)	Percentage (%)	Frequency (Respondent)	Percentage (%)
More Seating	3	3.3	11	11.0
Cyclist Friendly Place	0	0.0	1	1.0
Kids Furniture	5	5.5	4	4.0
Elderly Furniture	1	1.1	0	0.0
Satisfied	3	3.3	3	3.0
Open Spaces	4	4.4	1	1.0
Enhance Design (modern, natural, recycled, lighting, winter, historical, comfort, table, USB, etc..)	10	11.0	16	16.0

**participants*

Note: This is a subjective question that not every respondent chose to answer

Table 4-14: Suggestions on Street Furniture Design in the Future

"Enhance Design" received the highest percentage of suggestions among respondents. Many respondents provided various ideas on improving the design of street seating, as shown in Table 4.14. Specifically, 16% of respondents from Liverpool and 11% from Manchester emphasised the importance of design enhancement.

The second-highest suggestion for Liverpool was "More Seating," which garnered 11% of responses. In Manchester, the second-highest suggestion was "Kids Furniture" at 5.5%, followed by "Open Spaces" at approximately 4.4%. In Liverpool, "Kids Furniture" was only 1.5% behind Manchester, while "Open Spaces" received only 1%.

Both cities had the same frequency of three respondents who indicated they were "Satisfied," but the percentage differed due to the total number of respondents: 3.3% for Manchester and 3% for Liverpool. Additionally, 1% of respondents in both cities suggested making the area a "Cyclist Friendly Place" in Liverpool and providing "Elderly Furniture" in Manchester.

4.3.1.12 Street Furniture Preferences Design

The final question focused on respondents' preferences for street furniture design. The survey included nine photos of street furniture in various designs and styles, and respondents were asked to rate them from most preferred to least preferred. This question aimed to gather insights on the highest-rated street furniture, which can inform future proposals for street furniture designs. The figure below represents the top-rated street furniture as selected by the respondents. Respondents were also asked to explain their ratings. All comments have been analysed and compiled to ensure the report's formality.

Picture A



1. I love the steps because it's by my work, so I spend my breaks there. It's really relaxing and there's always someone playing music.
2. Practicality
3. Places for lots of people are the best. I think you have the option of talking to strange people
4. It is easier to sit with a group in big places

Picture E



1. Easy and simple benches are better
2. Basic design served well

Picture F



1. Looking good
2. I like open space with multiple usage options
3. Look modern and welcoming
4. Comfort and design

Picture I

1. Open Space is best
2. Interesting with other individual in comfortable place and you can do work outside here
3. I like cosy seating

4.3.2 Software Uses for Survey Data

The survey data reports all the results obtained from the analysis conducted using the SPSS (Statistical Package for the Social Sciences). The decision to use this software for analysis was made because the questionnaire included preference-related questions with a 'Likert Scale' that had a neutral option (Harpe, 2015). This statistical technique reduces the range of questions to a few key factors. It also produces a '*simple structure*', which defines the basic relationships among the variables in the analysis (M.Hashim, 2011). '*Simple structure*' is a term developed by Thurstone (1928) that involves rotating the factor axes to a position of greater 'psychological meaningfulness' (Comrey, 1992). Therefore, this method of analysis aligns with the questionnaire used in the study.

4.4 Interview Findings Data

Introduction

This section discusses the empirical findings from the interviews conducted as part of the research. The focus of the interviews was guided by the key research questions, specifically:

"How might street seating design contribute to active social behaviour for social sustainability in cities' public spaces?"

The interviews particularly concentrated on exploring the following primary research questions:

1. How does current street seating design affect active social behaviour in UK urban centres, such as Manchester and Liverpool?
2. How might we develop recommendations to emphasise the importance of active social behaviour for social sustainability through street seating design?

To delve into these primary questions, the interviewer also posed a set of sub-questions during the interviews. This section will cover the main topics of the research, namely "Street Furniture," "Sustainability," and "Social Sustainability."

4.4.1 Street Furniture

4.4.1.1 Street Furniture and Street Seating design from experts' view

In this section, the author discusses the critical views of experts on street furniture design, encompassing their understanding and the essential role it plays. Experts agree on describing street furniture as small-scale elements or micro-structures placed in outdoor urban settings. Despite agreeing on the concept, each expert (ED1, ED2, and ED3) has their own preferred terminology: "streetscapes," "street furniture," and "urban furniture," respectively.

- **ED1:** "I would personally use streetscapes."
- **ED2:** "The term street furniture is best to describe it."
- **ED3:** "We call it urban furniture as we think it is close to our main job of urban design."

However, all experts concurred that the term "street furniture" is most easily understood by the general public, even if it may not be the technically correct term. ED1 added that street furniture is "urban decor that creates an urban character."

The discussion further extended to expert views on street seating design. The experts shared a common perception of classic street seating as the "two-meter linear seat," or simply a bench, which is universally recognizable regardless of the material used. They agreed that street seating serves as a place for the public to relax, wait for someone, think, watch, and engage in conversation. They believe that such activities can contribute to making a place or city more active. Today, there is a greater diversity in street seating designs compared to the past, with more ingenious and creative designs emerging to attract more people.

- **ED2:** "Attracting interest in the diversity of these designs helps to liven up the surrounding atmosphere."
- **ED1:** "A real trend towards kind of multifunctional space-saving seating where it might be a raised wall around a planting bed or a very long concrete or granite seat that could be meters long."

4.4.1.2 How Experts Describe the Good Quality of Street Seating Design

Discussing the quality of a good street seat design is not limited to the materials used, safety guidelines, or size. Quality encompasses all these aspects and more. As ED2 stated:

"...the best quality of street seating design includes the location where it is installed."

Choosing the best location for street seating is crucial as it influences the arrival of more people. Another essential feature is aesthetic appeal. As ED1 mentioned:

"It should look good."

By "look good," the interviewee referred to the seat's ability to fit into the overall scheme of the place, including providing an adequate number of street seats. ED1 expressed a higher hope:

"...hopefully, the overall materials now unify in the façade of the building or the paving."

ED2 agreed with ED1, emphasizing the number of seats provided and adding distance and seating proportions as other critical elements in designing the best-quality street seating.

Additionally, ED2 explained the design guidelines they usually follow:

"They need to emphasize the seating size according to the standard ergonomics measurement because this requirement will ascertain the seating is accessible to disabled people."

The experts informed us that most design firms adopt this standard design requirement. Hence, a good street seating design must follow all legal requirements besides the points mentioned above. However, aligning legalities with current design trends and demands is crucial. New developments require more demands from the public. Thus, designers must work hard to meet those demands. With high expectations, designers need to be more creative, think innovatively, and explore various ideas while adhering to standards. The golden question is: will designers accept this challenge?

4.4.1.3 The Challenge of Designing Street Seating

In today's world, information is more readily available, especially online, making people more informed about general happenings than in the past. However, this does not mean that the information retrieved from the internet is always adequate. Some companies take advantage of these opportunities and proceed with projects without consulting the designers who possess vital information about the products they have designed. This

issue is evident from the experts' own experiences when dealing with customers and companies. As they have claimed:

"...it doesn't look easier for reality," ED2. "...you wanted it to be just how you planned, but at the end of the day, everything changed," ED1.

In short, they agreed that the process can be challenging:

"But this is called a challenge!" ED2. "It is always a big challenge when it comes to real projects," ED2.

Therefore, a careful process is vital to provide the best to the community. According to the experts interviewed, the process begins with all furniture designers conducting an initial study of the product (i.e., seating), people (i.e., crowd), and space (i.e., the context in which the seating will be placed). The designer then visits the project site where the specific design needs to be considered and gathers further details to serve as guidelines. Mini processes such as mock-ups and tests for total distance, placement, and proportions occur here.

At the end of the process, designers review their designs against the Disability Discrimination Act in the UK to ensure the proposed design is accessible to people with disabilities. This basic design process may not be the same for every company, as each company holds a different vision. However, the experts interviewed indicated that the final product would meet the needs of people with disabilities. Experts also noted that each country's local and cultural context is generally a valuable reference for urban or street furniture design, and they believed that, with a good approach to guidelines, this can be applied. Since there are no standards or guidelines for the street seating design process, below is a diagram summarising the whole design process based on brief descriptions from the interview sessions and the literature study.

LR - Street Seating Design Process

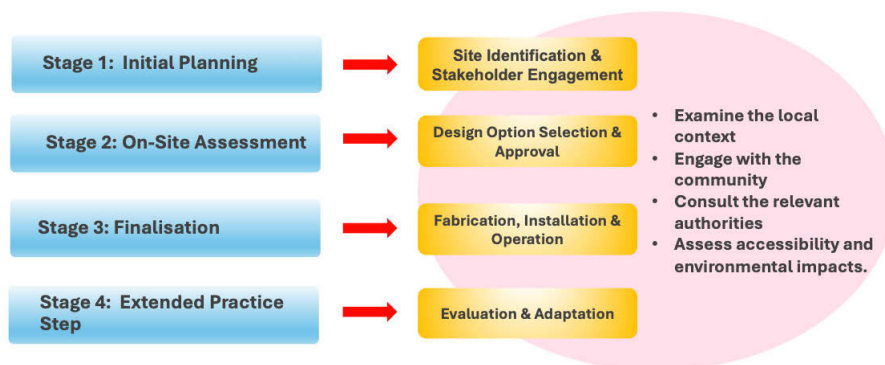


Figure 4-38: Street Seating Design Process Flow Diagram
Source: Author 2025

Thus, based on all interviews, implementing a street seating design is never easy. Although everything might seem perfect in the plan and the agreement was made, deviations from the process may occur. As claimed by ED1, *"things change not because you don't plan it well, but things change because it is a street seating."* For instance, ED1 reported that if an entire building project faces funding issues, street seating will usually be the first to be withdrawn. Thus, all efforts to agree on costs for the design of good street seating with the person in charge of project finances may be wasted from the beginning to almost the final process.

In other cases, according to ED2, clients may change their minds and decisions even when the seat is ready for placement or positioning. *"They came up with some advertising papers and said they want to change,"* ED2 noted. This change of plans can occur despite knowing that discussions and design processes sometimes take several months, including the time when all designs go through development to agreement.

However, as designers, meeting customers' needs is essential; we must learn to be skilled negotiators. They need to be capable of persuading the customer, not only verbally but also with facts and evidence, ensuring that both parties are satisfied with the final product. With the added value of cultural and local context, these design processes should excel. Moreover, according to ED3, one of the best methods to convince

customers is to bring them to the field. *"Let them experience the place, the atmosphere, and fill the gap. Also, feed them with some information, because additional information may be missed during the initial discussion or the current goals and targets of the design issue."* For instance, while "sustainability" is often a popular concept, how well do clients understand it? It is best to *"explain, guide, and suggest,"* ED3 added. This approach helps keep the design aligned with all the requirements and saves time in the process.

This detailed explanation emphasises that the design process for street seating involves complex interactions and negotiations, requiring designers to be flexible, persuasive, and well-informed to achieve the desired outcomes.

4.4.1.4 Section Summaries

From the interview sessions, several key insights emerge regarding street furniture and seating design:

- i. **Terminology and Understanding:** There is no universally preferred term for street furniture among experts, but the public commonly understands terms like "benches" and "seats." The essential aspect is that these terms denote objects that provide comfort and utility for people to sit, enhancing their urban experience.
- ii. **Design and Aesthetics:** Practical Street Furniture should be simple yet aesthetically pleasing, capable of blending seamlessly with its environment. It is viewed as an element of urban decor that contributes to a city's identity.
- iii. **Quality and Placement:** The best quality street seating encompasses material selection, design diversity, adequate quantity, and strategic placement. The location is crucial as it influences the seating's effectiveness and usability.
- iv. **Design Process:** Proper planning is essential for designing street seating. Designers must:
 - Have a structured process to guide their design efforts.
 - Be flexible and willing to adapt their process to accommodate client preferences and changes.

- Develop strategies to convince clients of the efficacy of their designs, such as demonstrating the proposed seating's location and context in person.

These conclusions underscore the complexities and challenges in street seating design, emphasising the need for a balanced approach that combines creativity, practicality, and client engagement to achieve successful outcomes.

4.4.2 Sustainability

4.4.2.1 What are the experts' views on sustainability?

Sustainability is a multifaceted concept without a universally accepted definition. However, it is generally understood to involve maintaining certain elements to a degree that does not compromise future generations' abilities to meet their own needs. The United Brundtland Commission in 1987 defined sustainability as:

Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. In addition to natural resources, we also need social and economic resources. Sustainability is not just environmentalism. Embedded in most definitions of sustainability we also find concerns for social equity and economic development.

(Bhamra & Lofthouse, 2007)

In design, sustainability aims to reduce negative environmental impacts while promoting the health and comfort of occupants. The main goals of sustainability are to reduce non-renewable resource use, minimize waste, and create healthy, productive environments (as discussed in Chapter 2). Sustainability's integration into design often reflects customer needs alongside expert recommendations.

Expert ED1 emphasised the market-driven aspect of sustainability:

"Sustainability is a selling point, regardless of which part of sustainability your design tackles because clients want that and demand all sorts of information."

ED3 highlighted the evolution of sustainability in design:

"In the past, most designs focused on selecting sustainable materials for their products. Even now, we still maintain the same selection, but as we move towards a more sustainable life, we want to ensure that sustainability applications are more holistic and benefit more parties and the environment itself."

This holistic approach, as ED1 articulated, spans:

"...the design process from material selection, design expansion, placement, and brightening user behaviour."

ED2 further elaborated on the comprehensive benefits of sustainability:

"We need sustainability to achieve not only environmental benefits but also social and economic."

In conclusion, experts agree that sustainability in design should address environmental, social, and economic dimensions. The trend is moving towards more holistic applications, ensuring broader benefits for society and the environment.

4.4.2.2 How do experts fit sustainability into design?

Sustainability in design has evolved towards a more sustainable living endeavour over time. This development resulted from the designer's own efforts following previous problems. For example, sustainability in design looks at the context of the environment and the user's social context. Thus, it becomes more satisfying when the effort does not stop; instead, it continues to grow in a perfect direction according to the lifestyle and needs of today's society. ED2, in his opinion, said:

"As for the current design, it is best to have the social impact as experts think; this will also help in the economic impact. Moreover, social sustainability is a brilliant and thoughtful idea because it often offers space savings."

Expressing her agreement with the statement above, ED1 emphasised that the key idea of space in sustainability is manifested when a designer can find a space with a large crowd at different times of the day (morning and evening); this will provide more chances for people to connect with each other. ED3, who supported the idea, said:

"Designers can take advantage of space as an attractive place that will keep users connected."

Given that sustainability involves many elements, including the environment, materials, placement and much more, experts believe that improving and making more efforts in finding new designs will ultimately result in satisfaction for both consumer and designer.

4.4.2.3 How designers' reconcile sustainability with public demands

The above discussion aligns with today's demands, where public members are more interested in finding "something more interesting, something new or something innovative". As such, ED3 emphasised that "designers must be more creative in finding the best ways to include socially active elements." ED1 also predicted a broad spectrum of street seating; therefore, the experts believe that with strategic planning and innovative design, they can meet public demands by enhancing street seating design.

To achieve this, a careful plan must be executed, starting from researching new ideas through stages of sketching, mock-ups, and product testing. Each of these steps can be improved by incorporating elements of sustainability as part of the decision-making process, especially during the selection stage of new ideas. This will provide more insight into how to meet public demands, who will ultimately be the main assessors of whether the street seating indeed contributes towards social sustainability.

According to the experts, designers should also conduct site visits to observe and experience the actual environment. As ED2 noted, "we can provide excellent products to the public" only by understanding the specific context and needs of the site. ED1 echoed this sentiment, expressing hope for a more integrated approach to street seating design:

"If only one street seating design can fit in with all environments where it becomes part of the overall design and not just something glued to the end."

ED1 believes that even a classic two-meter-high bench placed by the shoulder of a road has a vital role, offering a temporary place of rest, especially for the elderly or people with small children. Thus, satisfying public demands includes considering the diverse ages and social backgrounds of users.

The discussion further highlighted that in addition to environmental considerations, "the current design hopes to give more space to society." All experts agreed that sustainability allows consumers to choose their way of socializing. ED1 illustrated this by mentioning the inclusion of innovative seating options:

"Even the sun loungers are also one of the seats on the street because people are looking for something interesting, something new."

In summary, designers' concord sustainability with public demands through innovative, creative design processes, thorough research, and site-specific considerations. By integrating sustainability into each stage of design and addressing the diverse needs of the public, designers can create street seating that not only meets but exceeds public expectations, fostering active social behaviour and contributing to social sustainability.

4.4.2.4 Section Summaries

To conclude this section, it is argued that expert awareness of sustainability in design is evident. Although social sustainability has traditionally been one of the less emphasised pillars of sustainability, experts and designers are diligently working to incorporate it into their theoretical frameworks. They are committed to proper planning and strategies

that define and study social sustainability while meeting public demand for innovative designs that align with contemporary lifestyle trends.

The discussions above highlight that sustainability goals can be achieved with comprehensive and careful planning. Experts emphasised the importance of integrating sustainability into every stage of the design process, from material selection to final placement. They also stressed the necessity of understanding the social context and needs of the public to create designs that foster active social behaviours.

High expectations are placed on all parties involved in the design process to deliver the best outcomes for society. By addressing the environmental, economic, and social dimensions of sustainability, designers can create street seating that not only meets but exceeds public expectations, contributing to the overall social sustainability of urban public spaces.

4.4.3 Social Sustainability in Street Seating

4.4.3.1 Expert views on street seating that emphasise social sustainability

Following the discussion in the previous section, street furniture does indeed develop social sustainability. According to experts, street seating is the most suitable street furniture that can emphasise social sustainability, as it encourages more social interaction among the general public. These social sustainability efforts create social meeting places where people can gather and meet each other, which is increasingly important with population growth and globalisation. When functionally designed, these outdoor spaces justify social activities and contribute to forming a healthy culture in the local community.

For instance, one of the experts was responsible for social sustainability in a London street seating design project. ED2 shared his feelings as a designer: *"It was so much fun for me because every time I went to a project site, I would start counting the number of people using my design, and I would start taking pictures of them sitting in my street seats."*

This observation indicates that the community has successfully embraced the design, and consumers have embraced the goal of creating a socially sustainable culture. According to ED3, "People enter public places to meet their daily demands regardless of gender, age, and ability. Urban public spaces are built to facilitate people's basic needs, especially social sustainability."

ED1 agrees, adding, "*Social sustainability is an honour that is given to the community while it is an important field for urban designers.*" This suggests that urban designers and the community complement each other. She also shared her experiences in Norway and Scandinavia, where they have a different approach called Nordic life in urban spaces. "*For them, it is vital that they have some social-democratic approach to unite everyone,*" ED1 explained.

Furthermore, street seating significantly impacts social sustainability when installed in places with high foot traffic or specific sites in the right location, particularly outside shopping malls or public transportation stations. The demand for well-designed street seating is essential and increases yearly.

"*Generally, as we have known, some of us live alone, some wander and so on; therefore, the provision of space and seating on this street indirectly 'forces' them to liven up the atmosphere,*" ED2 concluded. He noted, "*When people see other people sitting, they will come and join, and you will see more people, they may be able to chat or whatever.*"

4.4.3.2 Challenges faced by experts in designing street seating

Each branch of work has challenges that come in various ways or situations. Focusing on this research topic, designing street seating that accounts for social sustainability was "*never easy,*" according to ED3. Experts, including ED2, often view the problem holistically and base their designs on user feedback to provide street seating that develops or focuses on social sustainability. Common challenges accepted by experts (ED1, ED2, and ED3) include improper installation sites, lack of financing, poor site plans, and even unreasonable client demands.

Hence, this section summarises data findings regarding problems or challenges mentioned by designers or those involved in designing street seating. The table below

summarises experts' views on the challenges they had experienced. To understand the scenario better, it has been divided into three main categories, which are the main pillars of this study:

PEOPLE	PRODUCT	SPACE
Vandalism: Applies most to the skateboarders when they damage (intentionally or unintentionally) the seating edges when pulling some potentially dangerous stunts.	Maintenance: Damages due to vandalism such as skateboarding cost a lot of money to repair. However, lack of funding seems to be a common problem.	Inappropriate activity: Such activities called for attention from the crowd, which in turn will stay for the show. Unfortunately, the crowd usually left a mess (e.g., rubbish, chewing gum or cigarette stubs)
Rough sleep: Rough sleepers are a " <i>big social problem</i> " in urban street seating. Despite the presence of the visitors, some rough sleepers continued occupying the seats. There were efforts to avoid them from taking over the street seating, however this remains as a serious issue. To quote the experts, rough sleepers are " <i>social and a huge problem</i> ," ED2.	Design Issue: Although the seats on the street have been deliberately designed to avoid and prevent people from sleeping, for instance: <ul style="list-style-type: none"> - Hand placement between seats, without a flat surface. - Installation of small lights every meter along the seating path. However, the cases number of is still significant and has damage the urban images. It somehow gives a second thought of the open space concept to the designers.	Appearance: Providing a better look and feel about urban development is increasingly challenging. It can also be one of the factors contributing to the stagnation of urban restructuring and the economic downturn.
Customer: Clients often required a seat without a table because they think a table requires higher maintenance costs. They believe people sit there and spill coffee or cake or food or sauce, and they must clean it regularly, and they have no funds for it.	Value-added: Customers also stipulated that the product's position must not be under a tree, although logically, it helps provide shade and scenery. This odd need arises because the customers believe birds will attract attention at the same time regular maintenance is needed. Some disagreed with wood materials, but other requested for new materials. Sound confusing but discussable.	Limited Furniture: Customers will ask for limited products to be installed but also asked to create a whole space to be more welcoming. In ED2's words: " <i>no seating - no stay, no bin - left messes, no furniture - waste space.</i> "

Table 4-15: Data findings on problems and challenges from a designer's perspective

These challenges highlight the complexities of designing street seating that meets the public's needs while ensuring social sustainability. Experts need to navigate financial constraints, client demands, and site-specific issues while also striving to create inclusive, accessible, and aesthetically pleasing designs.

The table above describes some of the problems or challenges encountered in designing and dealing with customers regarding street seating design. Several related issues were mentioned, but this study focuses more on street furniture, especially street seating. The problem most highlighted by the experts during the interview sessions was financial issues. Street furniture projects often have limited budgets, making it difficult for designers to decide on design, theme, or concept.

Another example of the expert experiences [ED1], *"I once had a project that required reducing the overall cost, and their best solution was to cut off the fund allocated for street furniture design; they forgot that street furniture illustrates images to most site projects. It is difficult, but also a reality."*

4.4.3.3 Section Summaries

Generally, providing street furniture that supports social sustainability takes work. However, this planning can be continued with the efforts and cooperation of various responsible parties, including the city council, the finance department, and the designers. The study of social sustainability in street furniture design is a long-term effort. Consensus and solutions to each problem continue to be sought and explored.

"A major process of urban transformation can take place in a variety of ways, and the sort of general approach that has emerged in urban design is just one of these possible ways."

(Madanipour, 2006)

4.5 Participatory Design Workshop (PDW) Findings Data

Introduction

With the need for evaluation discussed, the remainder of this chapter presents the findings of this evaluation. Details for every task in this participatory design workshop (PDW) are explained in Chapter 3. This section presents the findings from the PDW, subdivided into the following tasks:

- Task IA and IB (open discussion and post-note)
- Task II (presentation)
- Task III (sketching)
- Task IV (seating configuration)

4.5.1 Task 1A - (Open Discussion)

Three questions were posed in Task I during the PDW, and each was analysed using content analysis, with themes formed from the research performed. This section presents a "cloud word" visual graphic that displays how participants understand and answer questions more clearly, followed by a further explanation for each question asked.

Question 1:

"How do you understand street furniture?"



Figure 4-39: Word clouds for Question 1

The visual in Figure 4.39 is a word cloud developed from the content analysis. Here, street furniture is generally known as a “public property” or “public space” in a public or outdoor area. It serves as an essential service or equipment to the community, such as toilets, seats, bicycle racks, or bollards. As observed from the content analysis, all these properties or public spaces are intended for people to engage in activities like jogging, meeting, playing, or relaxing. The PDW participants, who also represent the public's voice, understand that the city council primarily provides all these amenities.

Question 2:

"In the process of developing a new city, do you think the innovation of street furniture design plays an important role in reflecting the city image and why?"

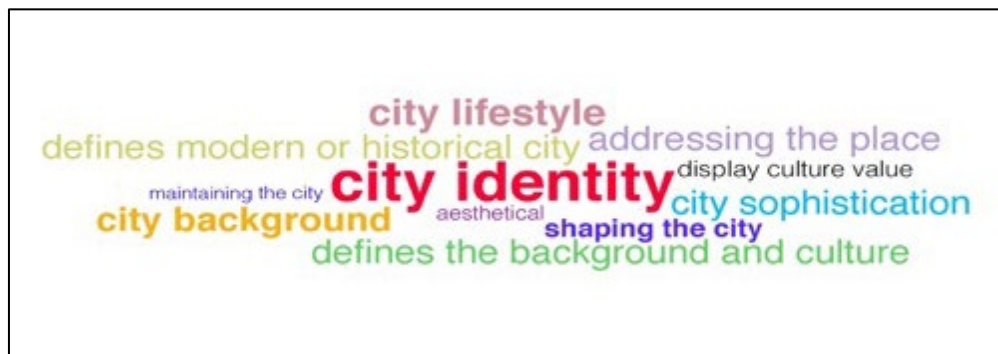


Figure 4-40: Word clouds for Question 2

Responding to the second question, all participants selected "Yes" when asked whether street furniture is essential in presenting the city's image. Figure 4.40 represents the word clouds of participants who agreed that street furniture represents a town's identity or the city's background. It also portrays the city's cultural value and reflects its level of sophistication, whether a modern city or one rich in history. Additionally, participants recognized that street furniture contributes to shaping a city, maintaining its aesthetic appeal, and promoting a healthy lifestyle.

Question 3:

"Specifically, how do you understand street seating?"



Figure 4-41: Word clouds for Question 3

Participants understood the third question well based on the two questions above, as most answers were clear and concise. As illustrated in the "Word Clouds" below in Figure 4.41, street furniture is commonly perceived as a place or space to "sit or relax." It is recognised as public property outdoors, serving as a temporary spot to relax, sit, and enjoy comfortably.

4.5.2 Task 1B - (post-Notes)

The IB task requires participants to give their opinion on each example of a picture shown during PDW using coloured post-notes. The questions were divided into three categories, namely, "good qualities of street seating design", "benefits the public socially", and "issues of street seating design". Participants wrote their opinions, suggestions, or comments on each colour-categorised post-note. Task IA uses the content analysis method to be analysed, and the results are shown in Figure 4.42, where all the answers are combined and placed in each category.

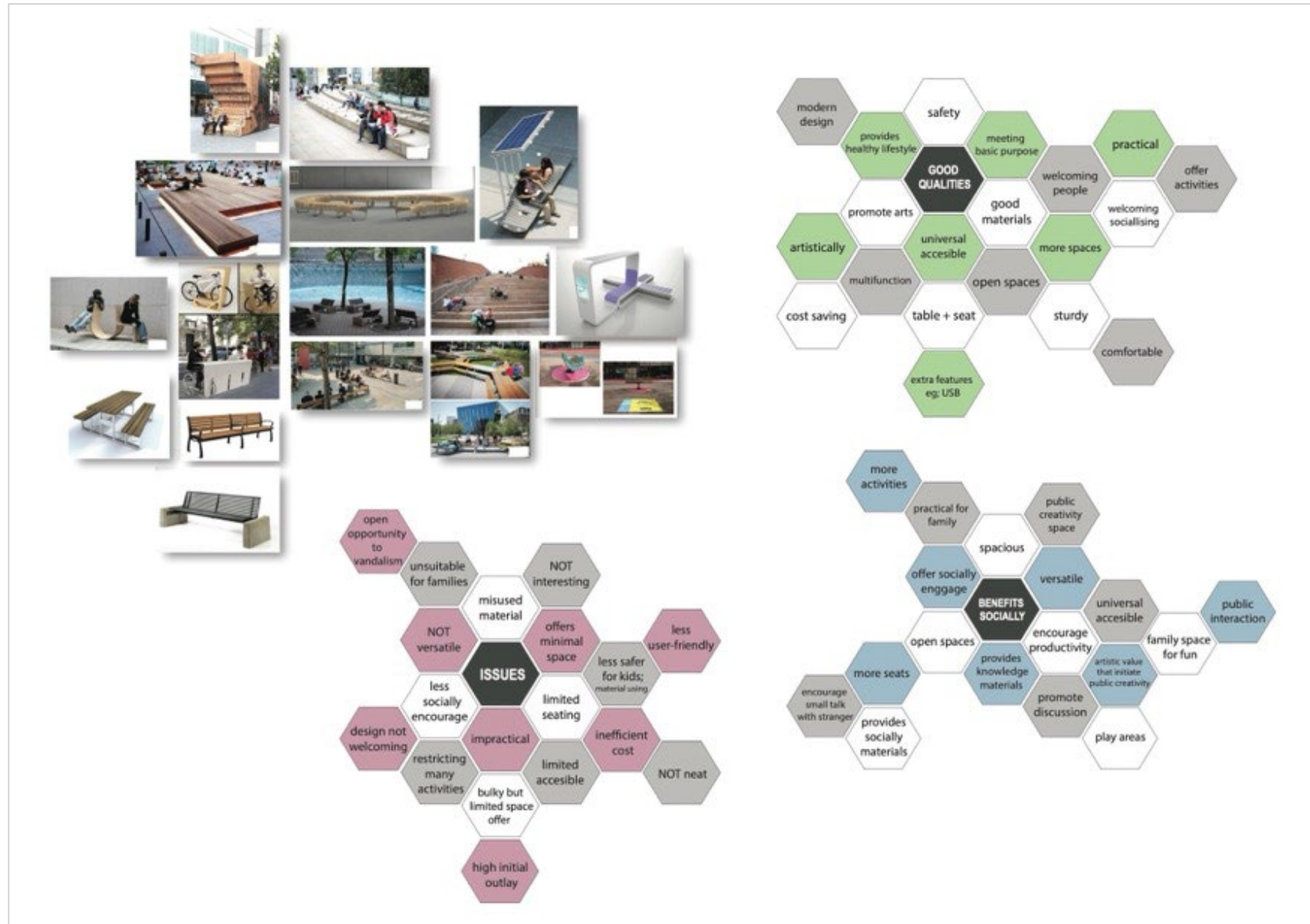


Figure 4-42: Task 1B Analysis Results

Question 1:

In your opinion, what are the good qualities of street seating design in these images?

About 20 keywords were obtained from the content analysis of Question 1, all representing the design elements of good qualities identified by the participants through the images. As mentioned above, the "basic needs" highlighted by the participants include "safety," "material use," "practical," "sturdy," "cost-saving," and "universally accessible," indicating a strong understanding of the importance of street seating.

Participants also argued that good street seat design should include "comfortable" seating and "multifunctional" furniture. Furthermore, providing "open space" and "more space" can indirectly invite "more people" and encourage "more socialising behaviours" because it "offers activities" that promote a "healthy lifestyle."

Moreover, as an added value, a good quality design should not only function as seating; participants advocated for multifunctionality, such as having a "seat with a table." They also suggested upgrading to a more "modern design" with features like "USB plugins" for added convenience. Beyond the technical aspects, some participants expressed a desire for an "artistic" touch to "promote art" through street seat design.

Question 2:

In your opinion, how can they benefit the public socially?

In Figure 4.38, the blue diagram interprets the participants' opinions on how street seat design can be socially beneficial to the public. Although 18 keywords were found in this task, some are interrelated, such as "spacious" and "open space." Specifically, this element of ample space is seen as beneficial by participants who suggested that "play areas" can provide "family space for fun."

Moreover, the proposal to have a "public creativity space" is projected to drive "productivity," "public interaction," "promote discussion," and create "more activities." Similarly, participants proposed "more seats" and the implementation of "universal access" and designs that are "practical for families," which could "encourage small talk with strangers."

"It is common to see a mother walk her baby in a stroller to have some rest out there; hence comfortable place with more seating for a family is vital and also helps to make a new friend to the next person sits."- PDW (anonymous)

As indicated in Question I, participants emphasised the multifunctional nature of street seating, synonymous with versatility, as a catalyst for social benefits. This versatility encompasses the capacity to offer socially engaging activities, such as providing knowledge resources (e.g., books, pamphlets, maps) and social resources (e.g., game boxes), as well as incorporating artistic elements to stimulate societal creativity.

Question 3:

In your opinion, what are the issues with the street seating design in these images?

Opinions were gathered for the problem displayed in the pink diagram, and 17 keywords were established. Participants agreed that "misused material" would "open opportunity to vandalism", and indirectly, it was "less safe for children". Participants also stated "high initial outlay" as one of the keywords for this category of issues. This idea resulted from the design of street seating that is "not versatile", "impractical" and "not neat", where they labelled it as "inefficient cost". Furthermore, most design that results in this problem is considered "unsuitable for families" or, in other words, "offers minimal space" and "restricts many activities". Besides, some designs have "limited accessibility" to certain parties. This resulted in the design being "less socially behaviour encourage [-ing]" or "not welcoming". Other than that, other statements gathered were "bulky design but limited to offer space" for seating, apart from "less user-friendly" and "not interesting" enough to attract more people to come or relax, let alone socialise.

4.5.3 Task 2 – (Presentation) Participants' Hometowns Street Seating

Participant-led design presentations, illustrated in Figure 4.43, provided valuable insights. Analysing transcribed presentations, employing thematic coding, focused on design advantages, identified problems, and proposed improvements. Table 4.16 categorises these findings into three primary themes: People, Product, and Space, aligning with the study's overarching framework

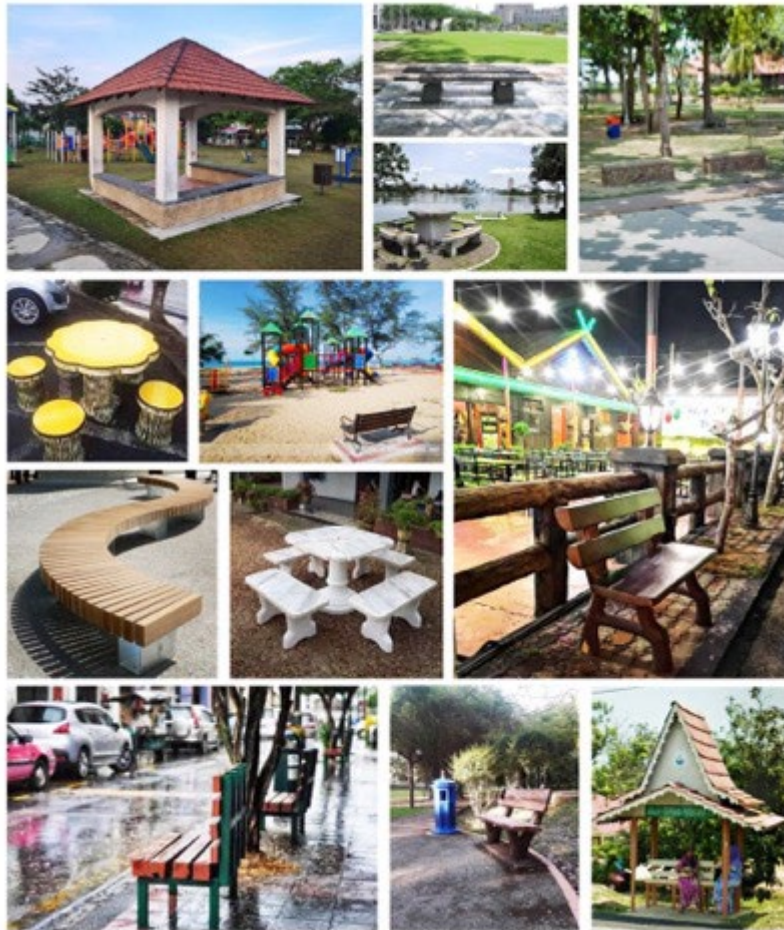


Figure 4-43: Compilation of Participant's Seating Selection

People	Product	Space
Needs a seat or temporary rest place	Simple design but enough to meet the primary purpose	Practical space for street furniture and people
Love the simple design but also recommend meeting the comfort of people, such as shade or seating size	Too much homogeneous design	Practical configuration to avoid abandoned seats
A wider size of seating but not bulky furniture for bigger size people	Requires quality materials such as durable , safe for children and free from vandalism	The environment and space should be appropriate to the product
Have a practical place to chat or socialise	A product that saves cost and has a long cycle	Comfortable and practical space for all types of people groups to do activities
Practical for everyone to access , especially the disabled	A large number of designs focus more on individuals than families	Open access to all groups of people
An atmosphere that welcomes more people	To maintain the signature of the city identity but not in the old way	Attractive design to attract more people
To suggest emergency button calls that can help groups of people in need	Additional knowledge materials such as maps, books or information boards are beneficial Likes how the design represents an urban culture in the city	

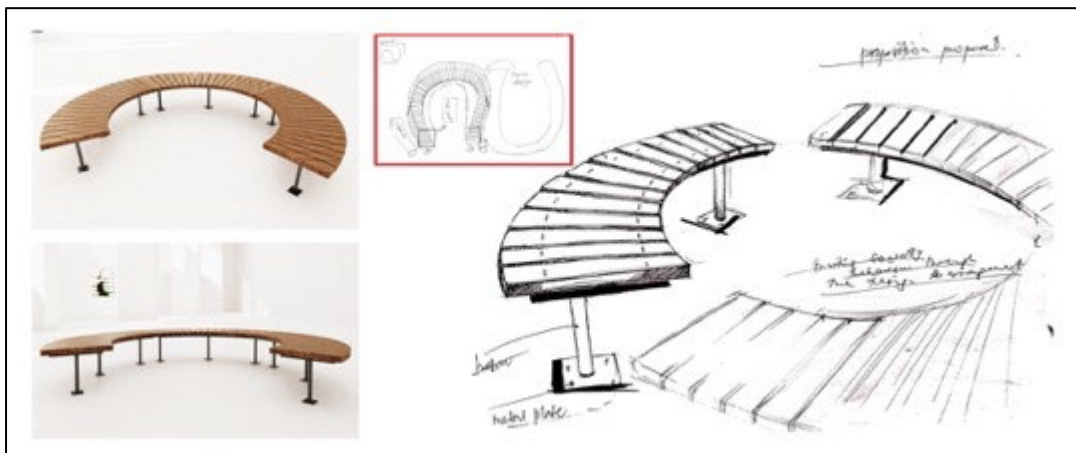
Table 4-16: Presentation Result

4.5.4 Task 3 – (Sketching) Street Seating Design

Task 3 required participants to sketch their ideal street seating design, providing valuable insights into desired design improvements. Since 90% of participants needed formal design training, and a diverse range of perspectives was sought, some sketches underwent redesign (with participant consent) to clarify design concepts. These refined sketches were subsequently transformed into 3D visualisations for enhanced clarity and communication.

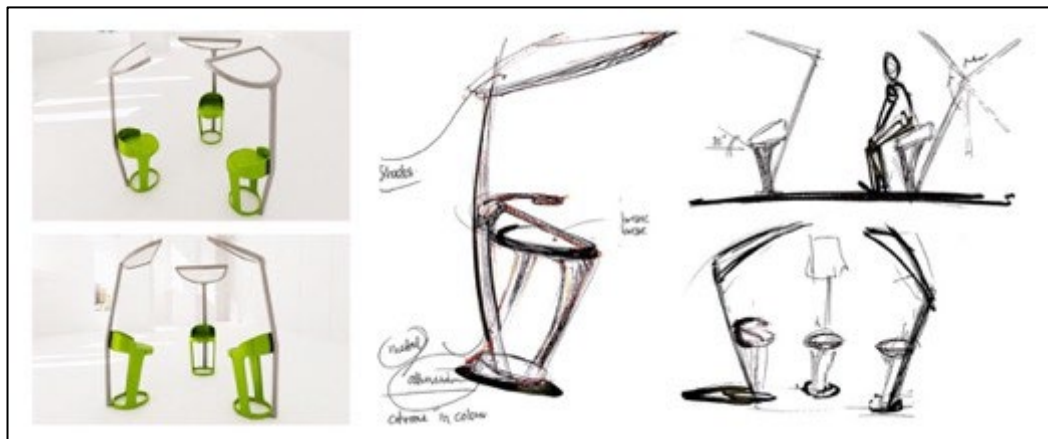
Note: Participants can use photo samples from the workshop session to reference their designs.

Sketch Design A



People	Product	Space
The "U" shape encourages social interaction	Cost efficiency materials are used	The "U" shape may require a large area
Spacious seating provides more comfort	Ease of maintenance	
Suitable for a group of people	Offers more seating	

Sketch Design B

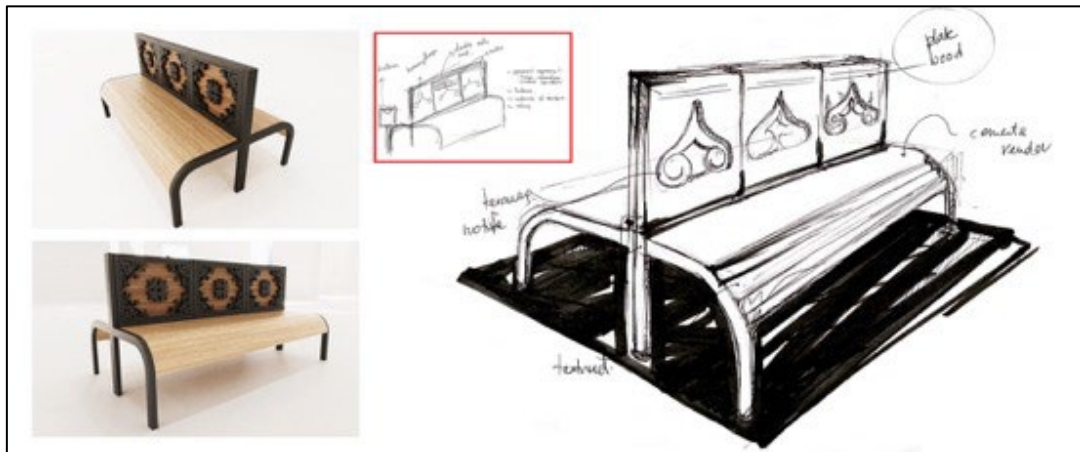


People	Product	Space
It still has a seating area and a private area	It has a unique concept of "one is more" when individual seats are arranged in groups	Option for management to make space measurements
Not sharing a seat but sharing a circle of environment that encourages social interaction		It is recommended to be in a specific area or room.

Sketch Design C



People	Product	Space
Can relax or have fun while doing group activities	New features enhanced from the existing design help easy entry	Ideal in a garden or green environment
The green environment soothes people	Incorporates social interaction	Will create a crowded environment with people

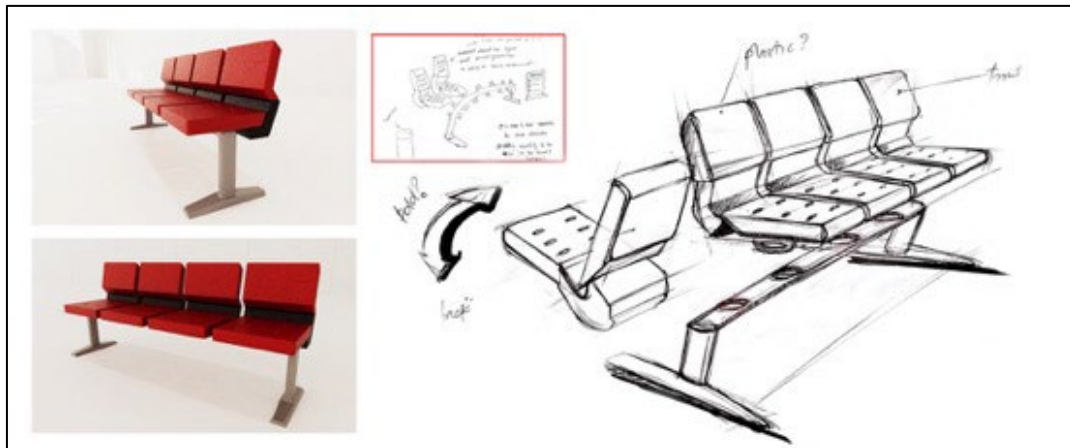
Sketch Design D

People	Product	Space
Can socialise while relaxing Increase from accommodating four people to eight people	Classic design but with new colour of white or grey Simple design, durable and easily maintained Low-cost maintenance	Suitable for a park or urban city It will make the environment more crowded with people

Sketch Design E

People	Product	Space
The design describes the city's inhabitants Honours the inhabitants' artwork	Represents urban culture Own design and not homogeneous Has leg rests and a choice of front and back seats	Can create a cultural vibe in a space Creates its urban environment

Sketch Design F



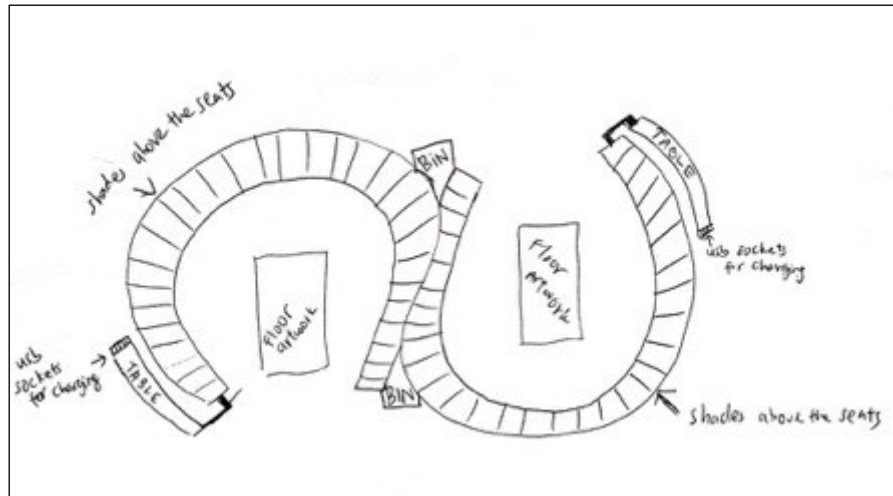
People	Product	Space
Good design to lean and relax	Biodegradable materials	It can be rearranged to form a large seating group or a stand-alone group
Safety for children and elderly in terms of sharp edges; small, easily removable materials, and easily rusty materials	Applies aesthetic values	The bright and simple colour of the product attracts many people to the space environment
	Ease of maintenance	
	Foldable seat backrest during rainy days	

4.5.5 Task 4 – (Seating Configuration) Street Seating Layout

In Task 4, participants visually translated their design concepts into street seating layouts. This exercise contributed to the research's primary objectives by illuminating how seating arrangements and design can influence positive social interaction and behaviour.

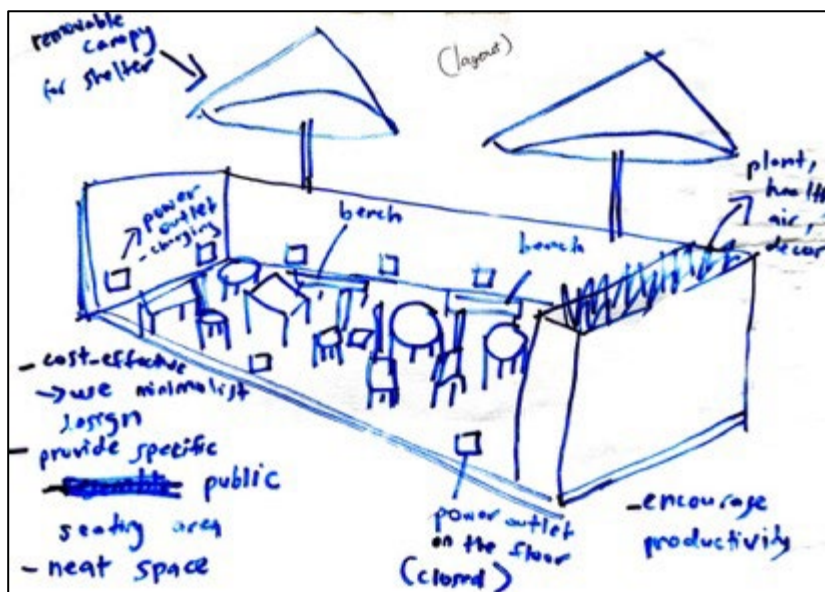
Note: These two tasks were performed in groups, and each member may have a different task assignment, so continuity of the design drawings is not required.

Layout A for Design A



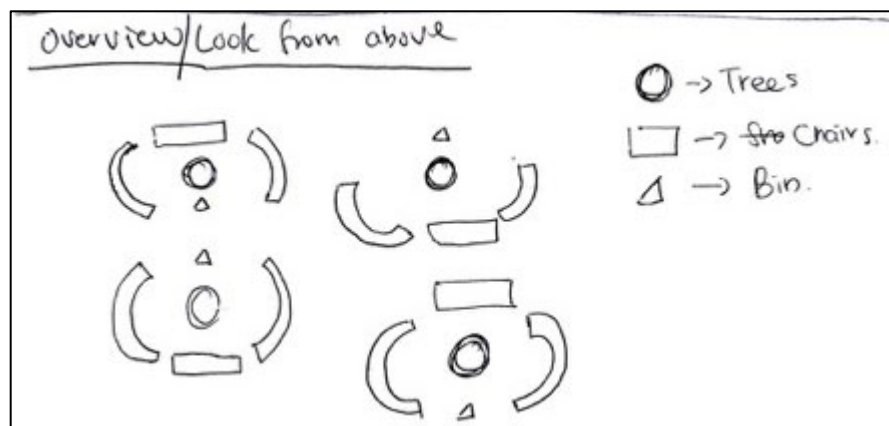
Layout A effectively demonstrates participant-proposed seating arrangements, waste disposal solutions, and supplementary furniture elements, including a USB charging station integrated into the table design. The U-shaped seating configuration facilitates face-to-face interaction while maintaining appropriate personal space. The compact charging station accommodates mobile devices, and the incorporation of floor artwork and shade within the seating area enhances the overall ambience. This layout is particularly noteworthy for its potential to foster social interaction among users.

Layout B for Design B



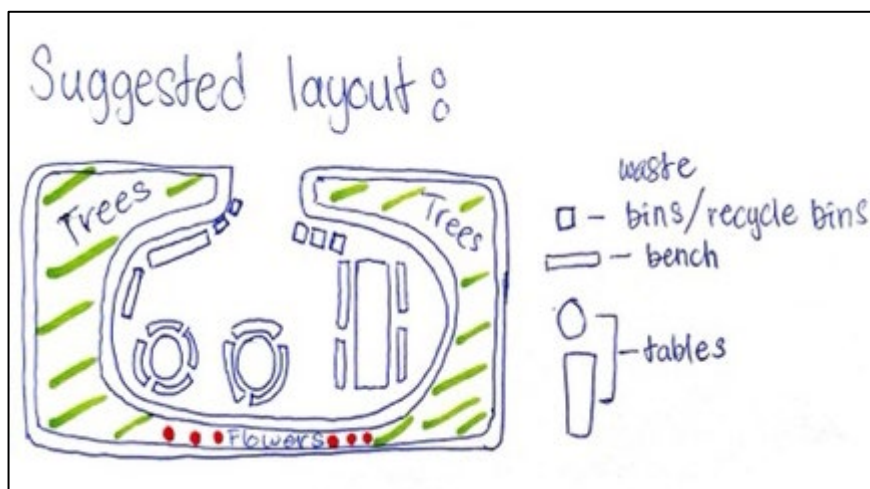
Originally conceived as a solitary seating option, Design B was effectively reconfigured into a social setting through layout planning. The proposed arrangement suggests creating dedicated social spaces by clustering these seats. Centralised tables within these clusters facilitate group discussions and interactions. While individual seats offer shade, the layout recommends larger canopies for accommodating larger groups during specific events.

Layout C for Design C



Layout C features three sets of street seating and a waste bin positioned beneath each tree, creating shaded and comfortable spaces for users. The design prioritises a clean and classic aesthetic.

Layout D for Design D



Layout F is designed for open spaces and requires ample room to accommodate its seating configuration. The layout fosters social interaction by enabling various activities, including street performances, while providing comfortable spaces for relaxation and people-watching. Four seats are arranged in rows with proximity to facilitate conversation between occupants. Integrated planter boxes enhance the aesthetic appeal, improve air quality, and create a sense of privacy and tranquillity within the seating area. The design also prioritises child safety with its enclosed layout.

4.5.6 Chapter Summaries

Participants demonstrated a strong understanding of street furniture design, with a particular emphasis on street seating. They acknowledged its role as a public amenity, which goes beyond its basic function as seating, contributing to urban aesthetics, identity, and fostering social interaction.

The participants highlighted several social benefits linked to street furniture, such as improved health and well-being, opportunities for varied activities, creating inclusive spaces, and cultural enrichment. However, they also pointed out significant issues, including design flaws, a shortage of seating, safety concerns, and a lack of suitability for families.

The PDW (Participatory Design Workshop) participants provided valuable perspectives on the challenges and opportunities related to local street seating design. While the artistic quality of the sketches varied, they generated creative design ideas, emphasising the importance of user-centred approaches. Additionally, the layout exercises highlighted the critical role that seating arrangements play in facilitating active behaviour for social sustainability.

In conclusion, the findings stress the importance of involving users in the design process of street furniture to help create vibrant, inclusive urban public spaces that cater to diverse social needs.

CHAPTER 5

DISCUSSION

5.1 Introduction

The previous chapter presented the findings from the four methodological stages of this study—walk-by observations, surveys, interviews, and participatory design workshops. Building on these results, this chapter synthesises and discusses the key insights that emerged from all data sources. To maintain coherence and alignment with the research aims, the discussion is organised around the study's three main thematic pillars: **Product**, **People**, and **Space**.

Through thematic analysis, keywords, recurring issues, and significant patterns were identified within each dataset and then triangulated with insights from the literature review. This process enhanced the validity of the findings and deepened the understanding of how street seating design influences active social behaviour in urban public spaces.

Cross-method triangulation revealed strong points of convergence, which ultimately led to the formulation of the design factors that are the central contribution to the knowledge of this research study. These factors highlight essential considerations for designing socially responsive street seating capable of promoting active social behaviour and supporting broader social sustainability.

The following sections outline the analytical process that guided the development of these factors, starting with the organisation and refinement of keywords extracted from the four data sources.

5.2 Keywords

Since this study employed thematic analysis across all data sources including **Observations, Surveys, Interviews, and Participatory Design Workshops**, keywords were methodically extracted from each dataset. These keywords reflect the prevailing conditions, recurring issues, and emerging opportunities in street seating design. Four illustrations are included (one for each method) to display the full set of extracted keywords.

Given the richness and volume of the raw data, the initial analysis generated thousands of keywords. However, many of these were conceptually similar or conveyed overlapping meanings (Figure 5.1). To ensure analytical clarity, a rigorous multi-stage filtering process was undertaken to consolidate, refine, and cluster the keywords into critical thematic categories (Figure 5.2). This iterative reduction removed redundant items and ensured that only distinct, meaningful descriptors informed the subsequent thematic framework.

These refined themes were then cross-referenced with the study's three core pillars—**Product, People, and Space**—and organised according to their relevance. The following sections utilise these integrated themes to explore the findings in detail, illustrating how each theme relates to the methodological insights and broader theoretical foundations.

5.3 Data Triangulation

To ensure robustness, the study employed **methodological triangulation**, combining insights from four complementary data sources: observations, surveys, interviews, and participatory design workshops. While Chapter 3 outlined the procedures, this section briefly summarises how triangulation enhanced the discussion presented here.

Each method contributed a different layer of understanding.

- **Walk-by observations** revealed real-time behavioural patterns, spatial usage, and existing street seating conditions.
- **Surveys** collected wider user perspectives, preferences, and perceived challenges.
- **Interviews** gathered expert insights on design intent, constraints, and professional practices.
- **Participatory design workshops** enabled users and experts to collaboratively express needs and suggest solutions.

By comparing and integrating these datasets, the study confirmed recurring themes, resolved discrepancies, and strengthened the evidence base underpinning the five design factors. Triangulation ensured that interpretations did not rely on a single viewpoint but reflected a holistic understanding of both lived experiences and professional perspectives.

This integrated approach that supported by the thematic consolidation in Figures 5.3 provides the foundation for the pillar-based discussions that follow.

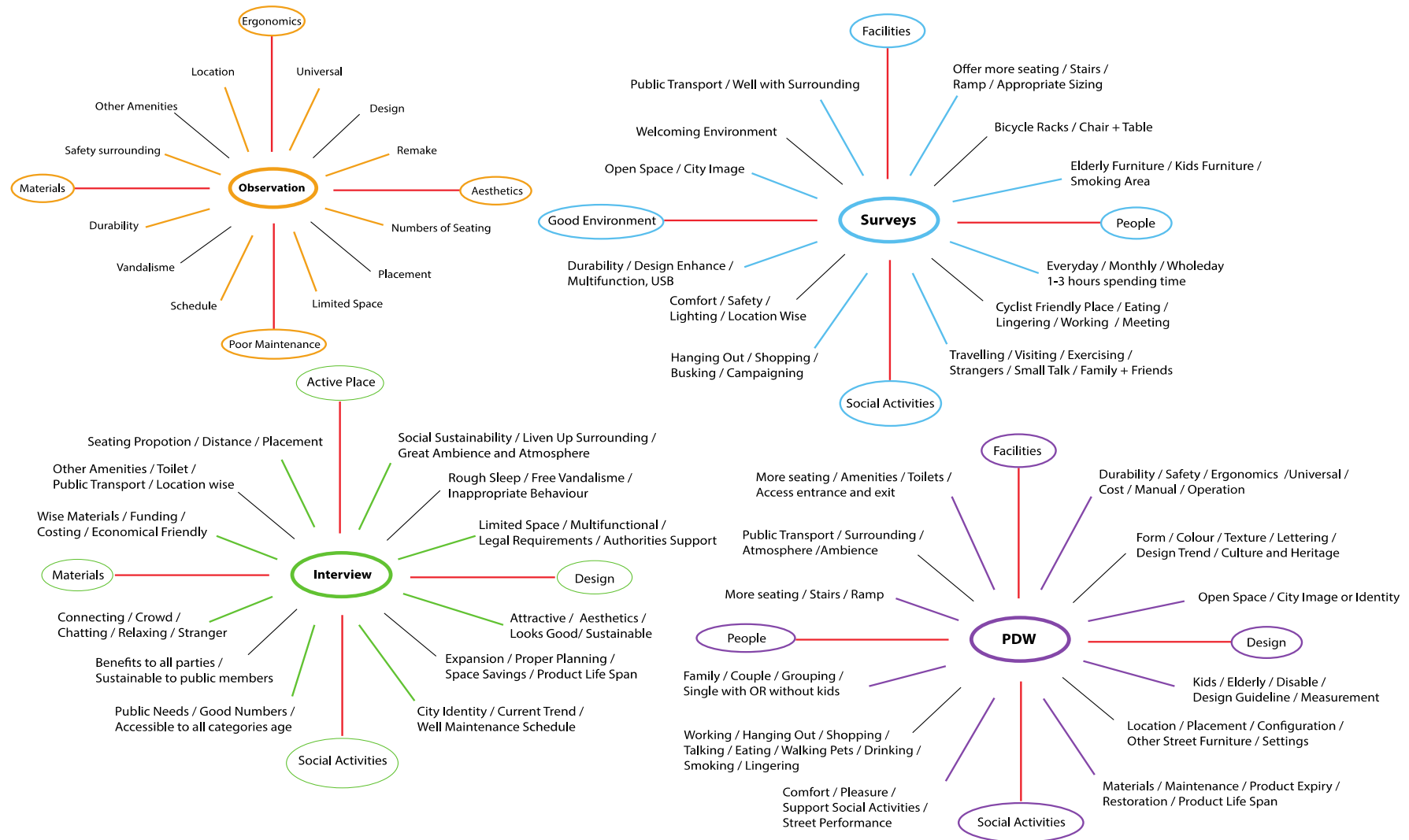


Figure 5-1: The Significance Keywords From Each Data Sources

Themes group of keywords

Figure 5.1 above illustrates the significant keywords that emerged from all four data sources, and from these keywords, they were organised into critical themes, as presented in the Figure 5.2 below.

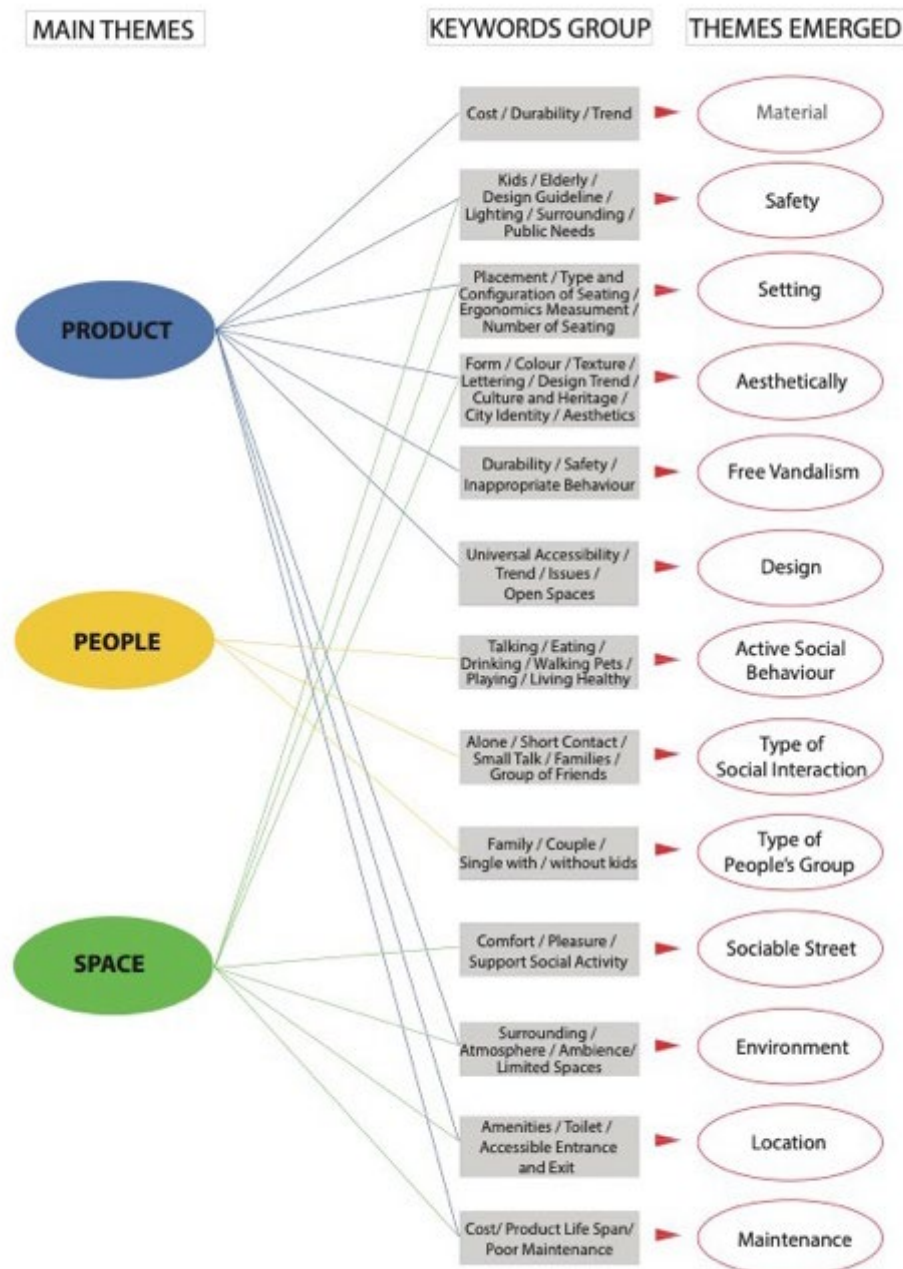


Figure 5-2: Themes Group of Keywords

5.4 Theme Development and Pillar-Based Discussion

This section presents the detailed discussion of themes that emerged from cross-analysis and triangulation. Drawing on the refined themes (Figure 5.3) and aligned with the study's three core pillars—Product, People, and Space—the analysis explores how each theme contributes to understanding and improving street seating design for active social behaviour.

5.4.1 Material Selection – Cost, Durability and Trend

Materials; Sustainability & Durability (MS|D):

The analysis reveals that 40% of street seating in Manchester and Liverpool is made of concrete, making it a significant material choice for its durability and sustainability. Concrete's resistance to damage (Yücel, 2013) and its ability to withstand external forces without needing additional installation make it highly durable. However, its performance in certain weather conditions (i.e. rain), where it lacks adequate drainage and ventilation, challenges its functionality and longevity. Thus, while concrete is robust, its lack of ergonomic flexibility in extreme weather impacts its usability.

Ergonomics, Comfort & Functionality (EC|F):

Concrete seating's large capacity (holding more than five people compared to standard benches that typically have two to four) enhances Accessibility & Inclusivity (A|I). These features enable broad social use, fostering inclusivity in public spaces. However, concrete's lack of comfort in cold or wet conditions impacts its ergonomic appeal, as it lacks proper drainage and can be uncomfortable in such environments. Wooden seating, on the other hand, aligns better with Ergonomics, Comfort & Functionality (EC|F) due to its natural properties of warmth in cold conditions and coolness in hot weather. However, regular maintenance is required to retain its qualities.

Craftsmanship, Timeless Appeal & Design Influences (CTA|DI) and Aesthetics & Visual Appeal (A|V):

Diamnti (2014) noted that concrete seating has moved beyond mere functionality to include aesthetics, with new production techniques allowing for varied colours, finishes, and shapes. This focuses on Aesthetics & Visual Appeal (A|V) and Innovation, Originality & Social Behaviour Promotion (IO|SBP), as the seating design directly influences its ability to promote social interaction in public spaces. The variety of visual elements that can be incorporated into concrete seating addresses timeless appeal and modern design influences. Although aesthetically pleasing and blending well with the natural environment, wood is more susceptible to wear and tear, which can diminish its long-term visual appeal.

Energy Efficiency, Modularity & Dematerialisation (EEM|D):

Concrete seating's modularity, as it does not require fixing to the ground due to its weight, contributes to Energy Efficiency, Modularity & Dematerialisation (EEM|D). Its long lifespan and reduced need for replacement also align with sustainability goals. Conversely, while more aesthetically pleasing, wood requires frequent maintenance and treatment, increasing the demand for energy and resources over time. Therefore, although wood is more comfortable and flexible, its higher energy and maintenance demands make concrete a more sustainable material choice in the long run.

Economic, Sustainability & Community Centric Design (ES|CC):

Both concrete and wood have their place in Economic, Sustainability & Community Centric Design (ES|CC). Concrete, due to its durability and low maintenance, offers a cost-effective solution over the long term, aligning with expert recommendations for selecting materials that provide value over time (Firdevs, 2013). Despite being inexpensive upfront, wood requires significant ongoing maintenance, which can strain public budgets. The maintenance costs of street seating must be balanced with the need for inclusivity and community engagement, particularly in areas with high foot traffic or heavy use, such as public squares or pedestrian areas.

Customizability & Integration (C|I):

Regarding Customizability & Integration (C|I), concrete seating offers flexibility in design, shapes, and sizes that integrate seamlessly with modern urban landscapes. This feature makes it adaptable to different environments, from parks to busy streets, supporting various social behaviours. Wood, while also customisable, presents greater durability challenges and greater integration challenges in harsher urban conditions due to its natural susceptibility to decay over time.

To conclude, the material selection for street seating plays a crucial role in shaping the social behaviour and sustainability of urban public spaces. As a durable and cost-efficient material, Concrete aligns with Materials; Sustainability & Durability (MS|D) and Economic, Sustainability & Community Centric Design (ES|CC), offering a long-term solution with low maintenance needs. However, it falls short in Ergonomics, Comfort & Functionality (EC|F), particularly in inclement weather. Wood, while favourable in terms of Ergonomics, Comfort & Functionality (EC|F) and Aesthetics & Visual Appeal (A|V), poses challenges in terms of durability and ongoing maintenance. Thus, balancing these themes is key to ensuring that street seating not only meets practical needs but also promotes social engagement and sustainability in urban design.

5.4.2 Ensuring Safety, Accessibility, and Sustainability in Street Seating Design

According to all participants in the participatory workshop (PDW), safety guidelines emerged as a crucial factor in achieving high-quality street seating design. This aligns with the **Accessibility & Inclusivity (A|I)** theme, as participants expressed concerns, particularly for vulnerable groups such as children and the elderly. They noted that these groups are more exposed to potential risks without safety measures: "...safety for children and elderly in sharp edges concerns..." (PDW4). This observation is supported by Gehl's (1987) findings that "...social activities may include children's play, greetings and conversations, communal activities and the passive activities of watching and hearing other people," which all demand inclusive seating environments.

In line with the **Ergonomics, Comfort & Functionality (EC|F)** theme, workshop participants voiced specific concerns about the design and materials used in street seating, particularly designs involving "sharp edges, materials that rust easily, or components too small to be stable." These comments reflect a heightened awareness of how proper design can ensure physical comfort and long-term functionality, especially for vulnerable users like the elderly and people with disabilities. Safety for people with disabilities also came to the forefront, with the group acknowledging that designers are increasingly attentive to these considerations.

Experts again emphasised **Ergonomics, Comfort & Functionality (EC|F)** during the interview sessions, particularly regarding seating dimensions. ED3 noted, "They need to emphasise seat size according to standard ergonomic measurements because this requirement will ensure the seat is accessible to people with disabilities." This theme intersects with **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)**, where thoughtful ergonomic design results in a timeless, functional product that meets the needs of a diverse user base.

Moreover, expert discussions also touched on **Materials; Sustainability & Durability (MS|D)**, with concerns about durability and long-term sustainability. Materials that can withstand weathering and reduce safety risks, such as rust or wear, were highlighted. This perspective reinforces the importance of selecting materials that ensure public seating remains both safe and visually appealing over time.

In conclusion, the concerns raised by both workshop participants and experts highlight the importance of considering multiple thematic elements—such as **Accessibility & Inclusivity (A|I)**, **Ergonomics, Comfort & Functionality (EC|F)**, and **Materials; Sustainability & Durability (MS|D)**—when designing street seating. These factors collectively help create safe, accessible, and durable urban seating that encourages social interactions, as supported by the theme of **Innovation, Originality & Social Behaviour Promotion (IO|SBP)**. Among the verse excerpts from ED3 are:

"They need to emphasise seat size according to standard ergonomic measurements because this requirement will ensure the seat is accessible to people with disabilities."

5.4.3 The Role of Seating Types and Ergonomics in Creating Inclusive and Adaptable Public Spaces

Following the above discussion, Standard Operating Procedures (SOPs) or safety guidelines are highly recommended before developing a high-quality street seating design. Therefore, there are considerations to be mindful of, particularly concerning safety, one of which is ergonomic measurement. Research findings confirm that ergonomic measures will make street seating relevant and desirable for the public spaces where they are situated. Taken from an excerpt (Openshaw & Taylor, 2006):

"Ergonomics can be an integral part of design, manufacturing, and use. Knowing how the study of anthropometry, posture, repetitive motion, and workspace design affects the user is critical to a better understanding of ergonomics as they relate to end-user needs, and results can be more comfort, higher productivity, and less stress."

Therefore, experts [ED1, ED2, ED3] agreed that the number of street seats provided should be practical, considering distance, seating proportions, and placement. However, based on the observations, the data show that only 5 of 15 street seating designs scored more than 50% in ergonomics, while the rest scored below this threshold. To ensure high-quality street seating, **Placement, Type of Seating, and Ergonomic Measurement** are crucial considerations for creating functional, sustainable, and socially engaging urban environments.

Placement of Street Seating

Proper **placement** is crucial for maximising both accessibility and usability in public spaces. Well-positioned street seating within pedestrian flow or near key urban elements (e.g., transport hubs, retail zones, green spaces) enhances its integration into

the **urban landscape** and encourages more frequent use. This reflects **Customizability & Integration (C|I)**, ensuring seating not only meets practical needs but also contributes to the overall design of the space. Experts [ED1, ED2] emphasised that **placement** should consider the distance between seating areas to balance opportunities for social interaction and solitude. Seating too far apart may discourage social engagement, while overly congested settings may reduce comfort and privacy, highlighting challenges related to **Ergonomics, Comfort & Functionality (EC|F)**.



Figure 5-3: Design A



Figure 5-4: Design B

5.4.4 Aesthetical – Form / Colour / Texture / Lettering

Street seating designs greatly influence the **Aesthetics & Visual Appeal (A|V)** of public spaces, enhancing the overall atmosphere and fostering visual harmony with the surrounding environment. The audit of street seating in Manchester and Liverpool revealed varied aesthetic outcomes, with some designs scoring as low as 2 out of 10, while others scoring as high as 8. This inconsistency points to a need for greater focus on aesthetic integration, particularly in colour, shape, and texture.

While concrete seating constituted 40% of the material used, its aesthetic potential depends on thoughtful design that complements the local architecture. As Yücel (2013) highlighted, concrete does not ventilate well after rain, which can diminish its visual and functional appeal. Nonetheless, despite its durability, workshop participants emphasised that design elements such as style and form are increasingly important to users, contributing to the city's identity and character. Concrete seating, when designed

in harmony with its architectural surroundings, can contribute to **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)**. Workshop participants emphasised that aesthetically pleasing designs, which reflect the local identity and culture, play a significant role in enhancing the character of a city.

A well-maintained street seating system is essential for **Economic, Sustainability & Community-Centric Design (ES|CC)**. Participants agreed that implementing a regular maintenance schedule would reduce long-term costs and ensure that the seating reflects community values and serves the public sustainably. Maintenance was viewed as crucial to ensuring longevity and fostering community engagement.

In conclusion, enhancing the aesthetic integration of street seating can elevate the visual appeal of public spaces and strengthen the connection between the seating and its environment, ultimately enriching the user experience. Participants also expanded their discussion on street seating maintenance, believing the fixed schedule and responsibilities assigned to maintenance would help reduce replacement costs for at least five years. Please refer to the figure below as an example of Manchester's existing street seating design.

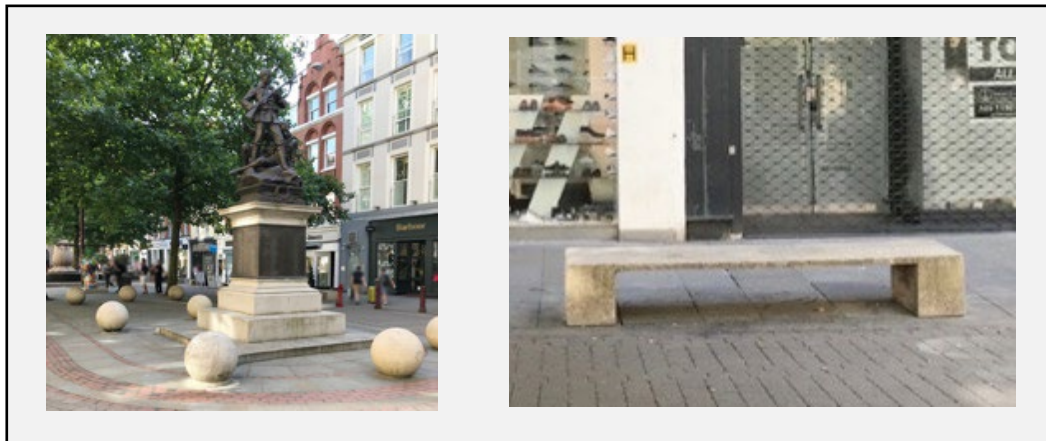


Figure 5-5: Example of concrete seating in Manchester, May 2018

Figure 5.6 shows two street seating designs using concrete as the primary material. The audit scores show that these designs did not score high on material. The photo clearly shows that these two seats could not positively impact the user; however, it could be the configuration or the form.

5.4.5 Vandalism Prevention: Ensuring Durability and Safety in Street Seating Design

Experts and workshop participants underscored vandalism as a major concern for street seating durability. According to ED1, "vandalism seems to be the biggest problem for authorities who fail to provide quality and durable seating." This relates to the **Materials; Sustainability & Durability (MS|D)** theme, which emphasises the need for robust materials that can withstand external forces, including vandalism. While local authorities need to enforce stricter regulations against misbehaviour, as suggested by the experts, workshop participants believed that preventive design measures could reduce vandalism incidents.

Workshop participants suggested designing street furniture to be **free from vandalism features** in the first place, which aligns with the **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)** theme. They argued that well-designed furniture, resistant to vandalism, would reduce future costs and maintenance needs, a point echoed by ED1 who stressed that "quality, durable, and safe products are cost-effective in the long run." The **Economic, Sustainability & Community-Centric Design (ES|CC)** theme supports this perspective, encouraging designs that promote long-term sustainability and cost-efficiency.

The audit data further revealed that material selection significantly impacts the **durability** and **safety** of street seating. Wooden furniture, for example, requires regular maintenance to remain safe, a concept under the **Ergonomics, Comfort & Functionality (EC|F)** and **Materials; Sustainability & Durability (MS|D)** themes. Workshop participants recommended selecting wood finishes that preserve both the material's appearance and structural integrity. According to ED2, "colour selection is essential, as bright colours require more frequent maintenance compared to darker tints," showing the importance of considering **Aesthetics & Visual Appeal (A|V)** alongside **durability**.

As Raipat (2016) concluded, "well-designed street furniture integrated into a public space can give it an identity and enhance the sense of place." This aligns with the

Customizability & Integration (C|I) and Craftsmanship, Timeless Appeal & Design Influences (CTA|DI) themes. Street furniture must not only provide comfort and safety but also reflect the character and identity of the urban environment, fostering a sense of community while reducing vandalism.

One way to reduce vandalism in street seating is by ensuring durability. Audit data revealed that material choice can influence the design's longevity and safety. For example, wood requires regular maintenance to maintain its safety features and appearance, while colour selection for concrete seats, whether light or bright, must consider environmental factors. Bright colours may require more frequent maintenance as they show damage more quickly, potentially affecting the seat's visual appeal over time. In addition to its primary function, it provides a space for user requests and comfort. In addition, this object can also offer information, educate, and help reduce vandalism.

Public spaces are the inevitable components of cities with their physical and ecological roles. They contribute to create ecologically healthy environments.

(Mehta, 2013)

5.4.6 Design – Universal Accessibility / Trend / Issues

The Participatory Design Workshop (PDW) emphasised that street furniture, especially seating, serves more than just an aesthetic purpose in public spaces. Participants highlighted that street seating should promote social activities alongside providing rest. This aligns with the **Accessibility & Inclusivity (A|I)** theme, which emphasises the importance of making street seating accessible and encouraging engagement for a wide range of users. Participants proposed designs that incorporate features for social functions, such as game tables, swing seats, or areas for reading materials, as these enhance user experience and social interaction.

The **Aesthetics & Visual Appeal (A|V)** theme also becomes essential here, as the visual integration of seating with the surrounding environment encourages a more

welcoming and usable space. The observational study confirmed that universally designed seating allows for more diverse activities, whether individuals want to sit, relax, socialise with family and friends, or spend time alone.

As depicted in the diagram, "The Wheel Seating" (left) and "The Square Seating" (right) represent two seating types that affect universal design differently. Under the **Ergonomics, Comfort & Functionality (EC|F)** theme, "The Square Seating" demonstrates greater stability and comfort, accommodating a wider range of users, including those with limited mobility, while "The Wheel Seating" appears less stable and may limit accessibility.



Figure 5-6 Example of two seats that impact Universal Design Differently

Experts [ED3] noted that street seating's success hinges on quality design, emphasising the **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)** theme. Both [ED2 & ED3] stressed that achieving high-quality design requires a research-driven process, addressing **Customizability & Integration (C|I)** and considering how the seating aligns with potential users, locations, and product features. This ensures that seating fosters inclusivity and social behaviour, promoting universal accessibility while addressing design trends and emerging public needs.

Example:

According to the survey data, the users of the two cities rated street seating as "good" for street seats according to the surrounding conditions. For instance, street seating

outside of Manchester Arndale [Market Street] had among the highest scores from observational data [70 points]: attractive design shape, colour and texture, strategic configuration, ergonomics and universal, innovative materials with easy maintenance, and a suitable atmosphere. In addition, this seating, placed under a tree, has three seats with armrests, and each seating has its section for privacy and, most importantly, universal access (see Figure 5.7).

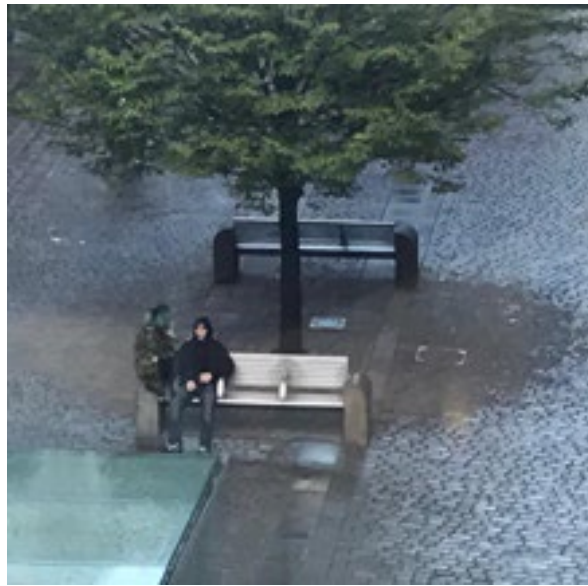


Figure 5-7 The Three-Seater seating, Market Street, Manchester, July 2018

**Due to ethics and all-time occupied seating, there are no close-up photos available*

Regarding street seating being welcoming within the surrounding environment, the results showed that 71% of users in Manchester and 81% in Liverpool rated the street seating as welcoming or very welcoming. More than two-thirds of participants felt that street furniture fit the environment. Some still chose the other option, meaning a gap still needs to be filled (see Figure 5.8 below).

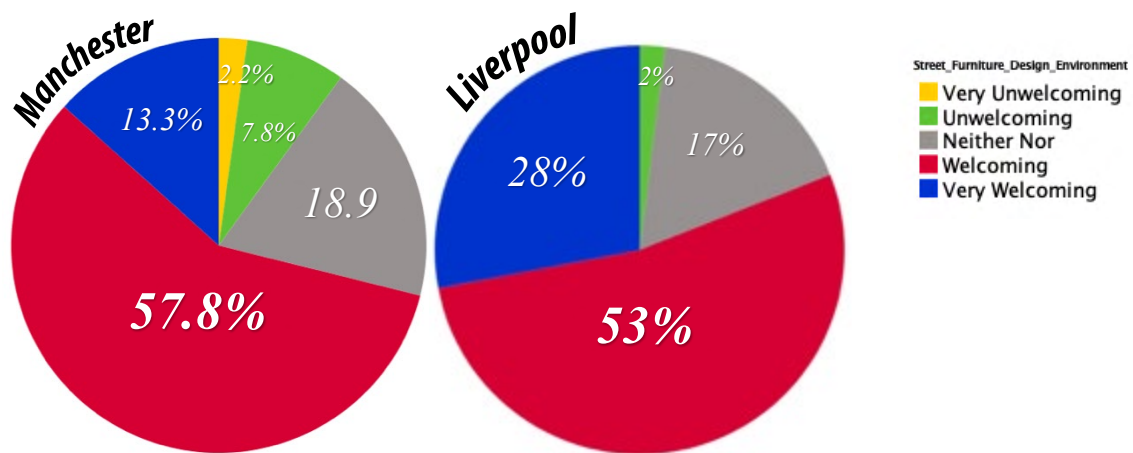


Figure 5-8 -Comparison of Street Furniture suitability with Manchester and Liverpool environment

According to the above data, PDW participants believed each design had advantages and disadvantages. The workshop tracked and collected all opinions on street furniture design problems and 17 issues were found. Among them are design-related issues, including substance abuse, opportunities for vandalism, and being unsafe for children. Participants also argued that "high initial production" was an issue because they believed current designs were not versatile, impractical and untidy. Participants also referred to it as cost inefficient.

Furthermore, the issues raised include all three main themes:

- 1- **People** - "less user-friendly", especially unsuitable for those with families.
- 2- **Space** - "limited accessibility" by certain parties, making the design less conducive to social behaviour.
- 3- **Product** - "unattractive" enough to attract more people to come or relax, let alone socialise and "non-ergonomical" design; "large but limited design to offer seating space."

In the literature, many studies highlight that street furniture aims to provide spaces with character and identity, encouraging people to enjoy outdoor areas beyond mere comfort. Street furniture can enhance a site's visual appeal, image, and identity when planned effectively. Street furniture's quality, organisation, and distribution reflect the quality of urban space and set standards and expectations for future development. The

goal is to combine and coordinate shape, scale, materials, and placement to create visual appeal, accessibility, and safety by understanding users' needs (Kang et al., 2019; P.-Y. Li et al., 2009).

5.4.7 Section Summaries

To conclude this section, it is recommended that safety features be prioritised from the outset in the design of street furniture, mainly street seating. This includes careful consideration of design, material selection, manufacturing methods, transportation, and end-user interaction. Previous studies emphasise that outdoor furniture must be made from safe materials and designed to prevent injury, avoiding sharp edges or exposed fasteners (Assunção & Camara, 2000; Zvonareva et al., 2020b).

Furthermore, to improve street furniture, designers or authorities should assess the intensity of activity in specific areas to strategically place seating, ensuring unobstructed pedestrian paths and safety. Street furniture, including seating, rubbish bins, signage, and aesthetic elements like fountains, should be practically placed to provide comfort and safety. Increasing aesthetic value is crucial, as experts agree it enhances the appearance and promotes a healthy lifestyle, benefiting both the product and the environment by improving the overall ambience (Grabiec et al., 2022c; Israsena et al., 2013).

Addressing vandalism requires a concerted effort from all stakeholders, as it remains a complex societal issue that has been widely discussed in academic studies. Beyond design, the durability of materials must be considered. New methods should be proposed to minimise vandalism, creating structures resistant to such behaviour (Arefpour et al., 2022). Additionally, this approach can support a more practical universal design. Harsritanto, (2018) note that few studies have explored universal and flexible street furniture designs for varying abilities and disabilities. Therefore, it is suggested that the current study focuses on this aspect, building on previous observations and discussions.

5.5 Themes: People

5.5.1 Active Social Behaviours – Talking / Eating / Drinking / Walking Pets / Playing

Street seating significantly supports active social behaviours in urban public spaces, as indicated through data. Across all 17 street seating observed at sites, most seating was consistently occupied during the one-hour observation period, depending on the placement of the seating, which showed its role in enabling social interaction. The observed behaviours ranged from eating, drinking, and chatting to family bonding and passive activities like reading. Although sitting was the most observed activity, as other studies have shown, it still lacks innovation in social sustainability. This supports the theme of **Innovation, Originality & Social Behaviour Promotion (IO|SBP)**, emphasising the importance of seating in promoting spontaneous social engagement.

Mehta (2013) reinforces the idea that street design should encourage social behaviours: "Creating urban streets that encourage social behaviours in our cities is one of the significant goals in city design to create cities for people." This is further supported by **Ergonomics, Comfort & Functionality (EC|F)**, which experts believe enhances active behaviours such as relaxing, waiting, and talking to strangers. These behaviours form the foundation of an active social space, as stated by ED1, who noted, "The activities encouraged by street seating include relaxing, waiting for someone, eating or drinking, and talking to strangers."

Experts (ED3) highlighted that designers should be creative in promoting social interaction while adhering to universal design standards. This echoes the theme of **Customizability & Integration (C|I)**, where the flexibility of seating design contributes to its social functionality. ED3 emphasised, "A managed street and well-designed components provide the broadest range of intensity of these social relationships," underscoring the need for thoughtful design in enhancing the user experience.

Ben Dhaou, Vasváry-Nádor, Gall, et al. (2022) further assert the importance of public spaces in cultivating different levels of sociability, such as passive, fleeting, and enduring sociability. These varied social interactions contribute to the **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)** of street seating, where the design must resonate with both the users and the surrounding environment to foster long-term social sustainability.

Supporting active social behaviours, particularly in urban retail settings, was further demonstrated by the fact that a significant number of respondents from both Manchester (83.3%) and Liverpool (49%) spent more than 2-3 hours per visit in these spaces. The primary activities included socialising with family and friends, resting after shopping, and engaging in casual conversations. This supports the **Aesthetics & Visual Appeal (A|V)** theme, where the visual and functional integration of street seating enhances its ability to support diverse social activities.

Moreover, the activities observed during the studies varied in duration. For instance, the longest activity recorded was 38 minutes of reading, followed by 30-minute periods spent sitting, chatting, or drinking. This reflects the theme of **Accessibility & Inclusivity (A|I)**, where seating that accommodates prolonged social engagement promotes inclusivity across user demographics.

Finally, the study aligns with **Economic, Sustainability & Community-Centric Design (ES|CC)**, as frequent use of street seating in retail areas supports a dynamic public space, enriching the community's social fabric while enhancing economic vitality. As Chen et al. (2016) note, "seating can support more than 50% of total stay activities, increasing the likelihood of passive contact and social activity," further solidifying the role of well-designed seating in promoting active social behaviours.

5.5.2 Type of Social Interaction

Mehta (2013) identifies three sociability characteristics in urban environments: passive, fleeting, and enduring. In his study, "Passive Sociability" refers to individuals who prefer being in the presence of others without engaging in verbal interaction.

"Fleeting Sociability" encompasses brief conversations or low-intensity interactions, often with new acquaintances or strangers. Finally, "Enduring Sociability" describes individuals who seek out public spaces, such as streets or open squares, for deeper social connections with friends, family, or community groups. These sociability characteristics were mirrored in the observations of street seating interactions. The data revealed three primary social interaction styles: those who socialise alone, those who engage in brief conversations (fleeting interactions), and those who interact in pairs or groups, typically with friends or family.

Survey responses further support these findings. When asked, "What is the purpose of spending time here?", 62% of participants in Manchester and 56% in Liverpool reported spending time with friends or family. Another 24% in both cities preferred solitary activities. Moreover, over 30% of survey respondents indicated that they were "likely" or "very likely" to engage in conversations with strangers, showcasing the prominence of fleeting sociability in these urban environments.

By welcoming everyone, they bring together different groups of people regardless of their class, ethnic origin, gender and age, making it possible for them to intermingle public spaces carry out educational, informative and communicative roles to strengthen public life. People from different segments of society interact and learn about each other in public spaces

(Stephen Carr, Carr Stephen, Mark Francis, Leanne G.Rivlin, 1992).

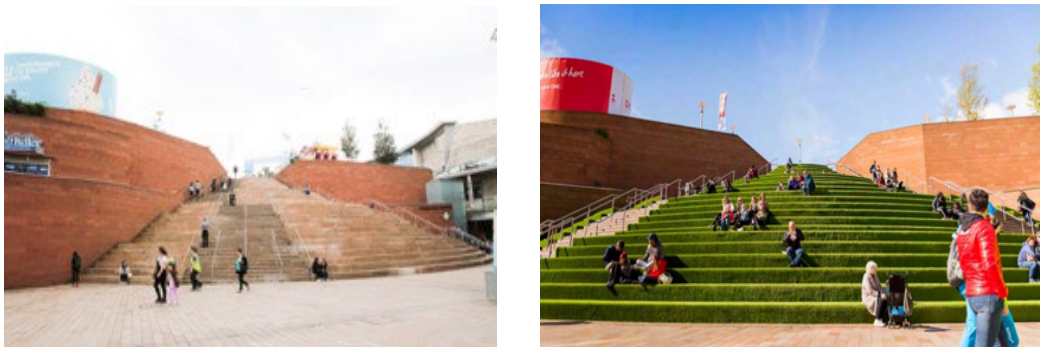


Figure 5-9: The Stairs Seating, Liverpool ONE, Liverpool, August 2018

5.5.3 Variety of User Groups in Active Social Behaviour and Universal Accessibility through Street Seating Design

The previous analysis categorised social interactions into three primary groups: individuals who socialise alone, those who engage briefly with strangers, and those who socialise within groups of friends or family. However, an extended observation reveals additional categories, such as those who socialise by age, encompassing groups of elderly people, adults, adolescents, and children. This finding reflects **Accessibility & Inclusivity (A|I)**, ensuring that public seating serves users' needs across different age groups and abilities. Children were typically found in smaller groups, likely due to safety considerations, underscoring the importance of accessible, secure seating designs.

Another group identified were solitary individuals accompanied by pets, highlighting the social activity of "walking with pets," as shown in walk-by data. This aligns with **Ergonomics, Comfort & Functionality (EC|F)** and **Innovation, Originality & Social Behaviour Promotion (IO|SBP)**, where seating configurations support diverse user activities, including pet-friendly spaces. Mothers with children and babies were also observed as a distinct group, indicating that seating must cater to family needs and support individual and group engagement.

Tourist groups were frequently observed sitting together, even when they were not part of the same original group. Their interaction often involved sharing travel stories, which ties into **Customizability & Integration (C|I)** and **Aesthetics & Visual Appeal (A|V)**. Well-designed seating integrated within the urban landscape serves functional purposes and fosters social cohesion in dynamic environments like tourist-heavy areas.

According to experts (ED3), "people enter public places to meet their daily demands regardless of their gender, age, and ability," emphasising the need for **universal design** that incorporates **Materials; Sustainability & Durability (MS|D)** to cater to these diverse social needs. Survey and observational data further support varied social

groups, reinforcing the need for designs that align with Craftsmanship, Timeless Appeal, and **Design Influences (CTA|DI)**.

The findings support prior research by Francis et al. (2012) and Stephen Carr et al. (1992), which assert that high-quality public spaces foster a sense of community, increase social participation, and enhance physical and mental well-being. These studies corroborate the need for street seating that supports diverse age groups and social behaviours, ultimately promoting **Economic, Sustainability & Community-Centric Design (ES|CC)** by enhancing the social fabric of public spaces.

See Figures X and Y, comparing the current design with one of the proposed designs by the group of participants.

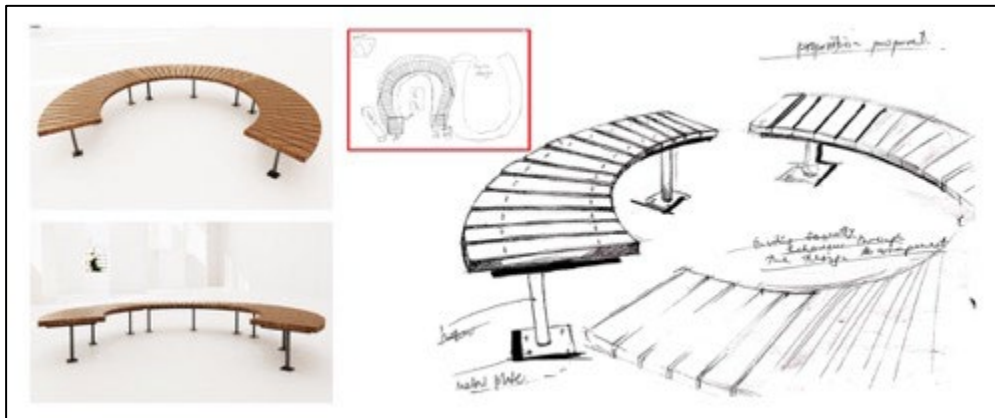


Figure 5-10: Design X



Figure 5-11: Design Y

5.5.4 Section Summaries

This section concludes with several key observations. First, more seating is required to support active social behaviour in urban spaces. Additionally, street seating design can be enhanced by incorporating value-added features that cater to different user needs. The cross-analysis data also highlighted that most social users form groups, whether among friends or family. Consequently, this research suggests that strategically placed seating that accommodates larger groups could effectively meet the needs of diverse social groups.

Furthermore, analysis of social interaction patterns indicates a preference for social grouping over solitary behaviour. The data show that respondents prefer socialising in groups to being socially alone. While only 30% of respondents expressed a likelihood of chatting with strangers, it is argued that this percentage is sufficient to initiate active social behaviour. Thus, enhancing social cohesion through seating design with added features could further support active social interactions. As recorded in the data, group-oriented seating designs should particularly consider various user categories, such as age, interests, and types (e.g., groups of parents or children).

5.6 Themes: Space

5.6.1 Enhancing Social Behaviour and Comfort in Urban Public Spaces through Street Seating Design

The research, conducted through seven case studies and 190 distributed surveys in mall areas, aims to determine whether street seating is a vital feature in urban public spaces that supports active social behaviour. The walk-by observation data provide compelling evidence: none of the street seating observed was ever abandoned; it was consistently in use. Additionally, the data reveal that the number of people frequenting observed sites with access to facilities such as public transportation was higher than at sites without. Approximately 58% of consumers in Manchester and Liverpool reported using street furniture provided in mall areas, with seats or benches emerging as the

most favoured options. Supporting this, survey respondents cited "hanging out with family and friends" as one of the top reasons for visiting malls, shopping, and work-related activities. Expert ED3 reinforced this, stating that "urban space creates a friendly path for people's enjoyment because it has a social meeting place where people can gather and meet others, and at the very least, it forms a healthy culture among the local community."

Survey results further indicate that environmental surroundings positively affect socialising behaviour, with 69% of respondents in Manchester and 57% in Liverpool expressing satisfaction. This highlights the importance of the **Aesthetic & Visual Appeal (A|V)** of public spaces, which encourages greater use frequency and influences spatial behaviour in urban settings. According to Chen et al. (2016), public spaces that promote socialisation foster a stronger sense of community. Survey respondents also identified design enhancements—such as modern aesthetics, natural elements, improved safety, additional lighting, and USB charging points—as features that could further elevate the user experience.

Regarding **Customizability & Integration (C|I)**, the study found that 78% of Manchester and 68% of Liverpool users rated the street furniture's fit with the surrounding environment as "Well." However, only 19% of Liverpool and 4% of Manchester respondents rated the street furniture as "Very Well" regarding service and suitability with the surroundings. These figures suggest that improvements are still necessary while the design is generally functional. This aligns with the theme of **Economic, Sustainability & Community Centric Design (ES|CC)**, as spaces need to be re-evaluated and adapted over time to understand users' needs and preferences (Abdul Rahman et al., 2018).

In conclusion, the environmental conditions of public spaces significantly influence social activities by facilitating necessary and optional interactions (Amir et al., 2020; Borowski, 2014; Mamaghani et al., 2015; Mehta & Bosson, 2021; Meijerink-Bosman et al., 2022). Streets and open public spaces play a critical role in shaping social experiences, as street activities are more visible and engaging than those inside buildings (Ja'afar et al., 2012).

5.6.2 Settings – Optimising Seating Configuration for Social Interaction and Community Engagement

The study of street seating design in Manchester and Liverpool offered valuable insights into the typical configuration and layout of street seating in urban public spaces. One of the key elements highlighted during the walk-by observations was the impact of group-like seating configurations. These arrangements attracted more public attention and encouraged social gatherings, particularly during street events. As Mehta (2013) noted, "people find stimulation in the setting and in seeing, listening to and feeling the presence of other individuals and groups who provide interest and stimulus to the environment."

During the initial data collection, seating configuration was a critical observation criterion for auditing street seating. The findings from this study demonstrated that practical seating configurations significantly enhance the vibrancy of urban public spaces while promoting social interactions.

Out of the 17 street seating arrangements audited across six locations, two seating types—"Stairs Seating", "Ramp Seating" and "Three Seater Seating"—received the highest scores for their practical configurations. These designs encouraged frequent use by the public, as observed during the walk-by study. The arrangement of these seats played a crucial role in avoiding underutilisation.

The characteristics of successful seating configurations include the following: "Stairs Seating," located in an open space, features three sections to prevent overcrowding and offers three seating levels, giving users the option to sit at different heights. Meanwhile, the "Ramp Seating" and "Three Seater Seating"—was spaced strategically, with a distance of 10 feet between each seat along two building blocks. This placement increased the availability of seating while promoting social interaction. According to PDW participants, a "practical configuration" is essential "to avoid abandoned seats."

Relating to Thematic Table:

1. **Ergonomics, Comfort & Functionality (EC|F):** The variety of seating heights in the "Stairs Seating" reflects ergonomic considerations, allowing users to choose the most comfortable position.
2. **Customizability & Integration (C|I):** The flexible design of both "Stairs Seating" and "Concrete Seating" demonstrates an adaptable approach to the urban landscape, promoting greater user interaction and inclusivity.
3. **Economic, Sustainability & Community-Centric Design (ES|CC):** Practical seating configurations help optimise space, reduce underuse, and foster a sense of community by encouraging frequent and varied social interactions.

By aligning with these thematic elements, these seating configurations help create inclusive, functional, and socially engaging urban environments. As experts agreed upon this, they said the number of seats provided should be relevant and oriented for practicality regarding "*distance*" and "*seating proportions and placement*". These three are the other vital elements in designing a street seating with the best quality, besides having ergonomic seats and excellent measurements.

In his study, Mehta (2013) reinforced the above data and emphasised the importance of design strategy. He claimed, "social activity on the street results from the interrelationship between land use activities, businesses, the physical elements of the street, and the planning and design strategies that manage all of these in the street space." Therefore, this study found that such thinking or understanding can open up creative possibilities for designers and allow them to design spaces that can successfully achieve the goals of users and designers in the long term.

5.6.3 Environment – (Surroundings | Atmosphere | Ambience)

The satisfaction with the environmental surroundings and the suitability of street furniture design within the urban context emerged as key concerns in the survey study. Analysis indicated that "satisfied" was the predominant response, with 69% of

respondents in Manchester and 57% in Liverpool expressing contentment with the environmental atmosphere. This reflects the significance of **Aesthetic & Visual Appeal (A|V)**, as Yücel (2013) emphasised, “The quality of urban spaces is indicated by their character and how well they create a sense of identity, as well as by the quality and placement of their street furniture.”

When asked about the suitability of street furniture design for facilitating social interactions, 78% of Manchester respondents and 68% of Liverpool respondents described the seating as "welcoming." This finding reinforces the importance of **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)** in shaping spaces that foster social behaviour and community cohesion.

However, as **ED2** pointed out, sustainability plays a pivotal role beyond just user satisfaction: "Urban public spaces are built to facilitate not only the basic needs of citizens but also sustainability." He further elaborated that sustainability efforts must encompass both **Economic, Sustainability & Community-Centric Design (ES|CC)** and **Materials; Sustainability & Durability (MS|D)** to deliver long-term social and economic benefits. In agreement, **ED3** stated that “social sustainability is a brilliant and thoughtful idea because it often offers space savings.” This highlights the practical and environmental gains that well-designed public spaces can offer.

Additionally, **ED2** remarked that, “When people see others sitting, they are more likely to join, which livens up the atmosphere,” pointing to the **Innovation, Originality & Social Behaviour Promotion (IO|SBP)** aspect. This social ripple effect is key to creating spaces where social interactions flourish naturally.

The study's findings underscore that environmental development and surrounding design should prioritise sustainability. As experts believe, sustainability not only improves the **Ergonomics, Comfort & Functionality (EC|F)** of public seating but also allows users the flexibility to socialise as they choose. Supporting this, Zhang & Lawson (2009) asserted, “The key to social interaction in public spaces is the quality of the public space provided.” Therefore, high-quality surroundings can significantly

contribute to fostering social interactions and creating more dynamic urban environments.

5.6.4 Strategic Placement and Design of Street Seating

The analysis confirms that the location of street seating significantly impacts its effectiveness in urban public spaces. As ED1 emphasised, a holistic design approach considers multiple factors, including **Materials; Sustainability & Durability (MS|D)**, **Aesthetic & Visual Appeal (A|V)**, and placement, which all influence user behaviour:

"...holistic in the design process reported is from material selection, design expansion, placement and brightening of user behaviour." (ED1)

Data from the study indicates that high-traffic areas such as shopping malls, public transport stations, and parks serve as "hot spots" for street seating. This is consistent with Yücel's (2013) findings, which suggest that the best locations for street furniture are high-pedestrian areas such as retail shopping corridors, transit stops, and cultural plazas. This ties into **Ergonomics, Comfort & Functionality (EC|F)**, as strategic placement encourages ease of use and social interaction.

Survey results further supported this, showing that "benches" were the most used type of seating, with 61.1% of respondents selecting them over other types. The findings also included ramps and stairs as preferred street seating options, proving that well-placed furniture plays a pivotal role in **Accessibility & Inclusivity (A|I)**. According to ED2:

"...the best quality of street seating design includes the location where it's installed... Best location will welcome the arrival of more people." (ED2)

Both experts agreed that the **Aesthetic & Visual Appeal (A|V)** of seating, alongside its functionality, must harmonise with the surrounding environment to enhance social

spaces. ED1 also highlighted the importance of visual integration: "*...it should look good.*"

The study's findings further revealed that key activities such as smoking, eating, drinking, and relaxing/hanging out were the most common around street seating. These activities illustrate the **Innovation, Originality & Social Behaviour Promotion (IO|SBP)** theme, where street seating promotes diverse social activities and transforms public spaces into active hubs. Yücel (2013) supports this by stating that well-integrated street furniture creates a unique identity and fosters a sense of place for communities.

Furthermore, the expert interviews shed light on the importance of collaboration between designers and clients in determining the best locations for street seating. This requires flexibility and communication, reflecting **Customizability & Integration (C|I)**.

As noted by experts, designers must:

1. Have a structured design process for street seating.
2. Be flexible in accommodating client requests.
3. Convince clients of their design's suitability by showing them proposed locations.

In conclusion, strategic placement, combined with aesthetic and functional considerations, is key to ensuring that street seating contributes to **Economic Sustainability & Community-Centric Design (ES|CC)** by fostering active social engagement and supporting the broader needs of urban communities.

5.6.5 Aesthetically – Design Trend with Holistic Space

The aesthetics of street furniture play a vital role in shaping urban identity and user satisfaction. Whyte (1980) stated that "aesthetic perceptions, which vary according to each individual's life perspective, together with cultural commonality, play a role in shaping the artificial elements that form part of a city's identity." This aligns with the

Aesthetic & Visual Appeal (A|V) theme, which focuses on how well-designed street seating harmonises with its surroundings, elevating the overall visual quality of urban spaces.

During the Participatory Design Workshop (PDW), all participants (100%) agreed that the aesthetic value of street furniture significantly influences the city's appearance and fosters a healthy lifestyle. Participants emphasised the importance of "applying aesthetic values" to all outdoor furniture. As Peyman & Gökçen Firdevs (2014) posited, elements such as symbolism, material, texture, and colour create identity and enhance the psychological comfort of the space for users. This resonates with **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)**, reflecting the importance of craftsmanship and timeless design in public spaces.

ED3 further explained that current trends in urban seating focus on multifunctionality: *"A real trend today is multifunctional space-saving seating where it might be a raised wall around a planting bed or a very long concrete or granite seat that could be metres long."*

This trend highlights the role of **Customizability & Integration (C|I)** and **Energy Efficiency, Modularity & Dematerialisation (EEM|D)**, emphasising flexible design solutions that blend seamlessly with the urban landscape while optimising space usage. Furthermore, **ED1** and **ED3** pointed out that contemporary users are highly demanding: *"Today's people are more demanding in terms of having a new product design; therefore, designers have to work hard to meet those demands."*

This links to **Innovation, Originality & Social Behaviour Promotion (IO|SBP)**, as designers must create unique and socially engaging spaces that appeal to modern users. Gehl (2010) added: *"An increase in environmental quality will boost optional activities and at the same time increase the social activities."*

To meet these high demands, designers must not only follow trends but also incorporate up-to-date technologies, as explained by Ghorab et al. (2011):

"In environmental design, considerations of shape, material, colour, and texture can play an active role, depending on the space requirements and choices made by the designer."

This aligns closely with **Materials; Sustainability & Durability (MS|D)**, ensuring that street seating is durable, sustainable, and adaptable to the evolving needs of urban spaces.

Whyte (1980) offered a pertinent observation regarding the importance of inclusivity: *"'Undesirables' are not the problem. It is the measures taken to combat them that are the problem... The best way to handle the problem of undesirables is to make the place attractive to everyone else."*

This statement underscores **Accessibility & Inclusivity (A|I)**, where creating attractive, accessible spaces invites everyone to participate, thus fostering a socially vibrant environment. In conclusion, integrating aesthetic trends, multifunctional design, and holistic space planning supports both **Aesthetic & Visual Appeal (A|V)** and **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)**. Designers should adopt a creative, forward-thinking approach to accommodate evolving trends and user expectations while adhering to sustainability and social engagement principles.

5.6.6 Enhancing Safety and Social Engagement through Street Seating: The Role of Lighting and Spatial Design

One of the key focuses of this study was identifying what constitutes a good street seating design. The analysis from various data collection methods found that safety is a paramount factor involving several aspects:

1. **People:** consumers, designers, distributors, customers;
2. **Products:** design, clear safety guidelines, use of materials;
3. **Space:** location, environment, atmosphere.

The safety elements concerning **People** and **Products** have been discussed under previous themes, such as **Ergonomics, Comfort & Functionality (EC|F)** and **Materials; Sustainability & Durability (MS|D)**. In this section, the focus shifts to **Space**, specifically the safety and security of the physical environment where street seating is placed.

According to participants in the Participatory Design Workshop (PDW), ensuring that street seating is located in well-lit, public areas is critical to prevent crime. This aligns with the theme of **Accessibility & Inclusivity (A|I)**, where the placement of street seating in accessible, safe, and inviting spaces is essential.

For example, Batra (2017) highlighted the importance of urban street lighting in enhancing security:

- Reducing accident risks;
- Discouraging crime;
- Protecting property;
- Creating secure environments for habitation;
- Discouraging vandalism.

Adequate lighting does not only improve safety for road users, including cyclists and pedestrians, but it also helps to alleviate the fear of crime. This aligns with the **Aesthetic & Visual Appeal (A|V)** theme, where lighting enhances the atmosphere of public spaces, making them more visually appealing and safer. **ED2** affirmed this by stating: *"Good lighting can transform neglected city areas into attractive urban settings and extend the hours for commercial and social activities."*

During a walk-by observation in winter 2018, it was noted that seating in poorly lit areas, such as St Anne's in Manchester, received less usage compared to seating in well-lit spaces between two malls ("The Ramp Seating"). Although St Anne's had more seating, the lack of lighting led to the area being underused, especially at night during the longer winter evenings.

This observation supports Phillips' (2004) findings, which asserted that efficient urban lighting enhances night-time activities by creating attractive environments and emphasising the unique character of urban spaces. Furthermore, this connects to **Craftsmanship, Timeless Appeal & Design Influences (CTA|DI)**, where lighting and layout contribute to the lasting appeal and usability of street furniture.

Additionally, the research revealed that brightly coloured seating, as opposed to dark-coloured designs, improves visibility, contributes to a sense of space, and indirectly enhances safety. **ED1** emphasised the importance of not just lighting but also the layout: *"Beyond lighting, the proposition layout of the space is critical."*

Participants in the PDW also engaged in a task where they proposed layouts for urban street seating (see figure). One participant emphasised the use of soft flooring materials to ensure children's safety, making the space more family-friendly. This further ties into **Economic, Sustainability & Community-Centric Design (ES|CC)**, highlighting how well-planned layouts encourage community engagement and ensure long-term sustainability.

5.6.7 The Role of Maintenance and Cost in Sustainable Street Seating Design

The study's analysis of 15 different types of street seating across Manchester and Liverpool revealed that maintenance and cost were central concerns during the participatory workshops. Many participants argued that regular maintenance was crucial due to the physical wear on street seating. Experts also reinforced this view, suggesting that a periodic maintenance schedule could help prolong a product's lifespan, ensuring safety is continuously upheld.

The analysis aligns with the **Materials, Sustainability & Durability (MS|D)** theme, emphasising how appropriate materials and regular upkeep can sustain the seating's condition and longevity. Abdul Rahman et al. (2018) posited that poorly maintained street furniture leads to discomfort among users and a sense of unsafety, affecting the entire urban environment.

However, as the **Economic, Sustainability & Community-Centric Design (ES|CC)** theme highlights, cost remains a major consideration. Experts admitted that street seating is often the first element removed in projects facing budget constraints. Moreover, they revealed that maintenance costs discourage the inclusion of some aspects, like tables or shades, which are often rejected by clients who aim to minimise upkeep expenses.

Walk-by observations revealed that seats such as "The Concrete Seating" and "The Stone Ball Seating," which were previously presented, showed wear and tear, particularly in bright-coloured areas. While different authorities manage each space and product, it became clear that without routine maintenance, seating appears faded and unappealing over time, contributing to the visual degradation of the space. This underscores the need for **Aesthetics & Visual Appeal (A|V)** to be maintained through proper upkeep.

Participants in the workshop argued that neglected seats would become abandoned and damaged, with users likely avoiding them due to their appearance. Weather conditions, humidity, and bird droppings further accelerate the deterioration of seating, particularly in areas with bright colours, which tarnish more easily.

This observation contradicts previous data suggesting that bright colours contribute to safety by improving visibility from a distance. Nonetheless, experts confirmed that maintenance remains a significant challenge for authorities, as articulated by **ED1**, who said: *"Maintenance seems to be the biggest problem to the most authority they failed to provide."*

Moreover, experts such as **ED2** believe that designers need to consider intelligent planning in the design process. Maintenance should not be an afterthought but integral to the overall design, including low-cost, durable solutions.

This speaks to **Customizability & Integration (C|I)**, as designers must create seating that is easy to maintain and fits into the urban landscape seamlessly. Designers must

present strategic proposals to their clients, ensuring that maintenance concerns are adequately addressed.

From an environmental standpoint, Tyl et al. (2015) suggested that designers should focus on locally available materials and renewable resources, ensuring that products remain sustainable and easily maintained until the end of their life cycle. This relates to **Energy Efficiency, Modularity & Dematerialisation (EEM|D)**, which stresses the importance of sustainable practices and materials in street seating design.

Experts reaffirmed that intelligent planning is essential to long-term street seating success, with **ED1** emphasising the need for "*proper planning*." Despite these challenges, **ED2** highlighted the role of designers in guiding clients:

"We explain, guide, and recommend."

This statement encapsulates the balance designers must strike between economic feasibility, durability, and the practicalities of long-term maintenance.

5.6.8 Section Summaries

This section summarises the core findings, stating that user collaboration in street seating design leads to better outcomes and increased frequency of use. By involving stakeholders in the design process, designs address community needs and desires more effectively. The study confirms that multiple factors influence social activity in urban spaces, and designers should align street seating to meet users' varying expectations.

Street seating plays a crucial role in fostering active social behaviours and enhancing individual well-being. It encourages people to linger in public spaces, thereby creating a more socially active and engaged urban environment. Additionally, social sustainability, as highlighted in the research, aims to mitigate social risks and problems. Without socially-focused practices, sustainability efforts may face disruption due to gaps between theory and practice. This study shows that street seating

serves functional purposes and contributes to the broader goals of social sustainability, making urban spaces more inclusive and interactive.

5.7 Summary of Emergent Design Factors

This chapter provides a detailed exploration of the findings from the various data collection methods employed throughout the study, including walk-by observations, participatory workshops, and expert interviews. The results present key insights into how street seating design plays an integral role in shaping social behaviour and enhancing the quality of urban public spaces. The findings underscore the importance of various factors that influence the effectiveness of street seating in supporting active social behaviours and promoting social sustainability.

The analysis reveals that street seating design significantly affects user interaction, with factors such as configuration, placement, aesthetics, safety, and maintenance all playing pivotal roles in enhancing the social experience of public spaces. The seating's design must cater to a variety of user needs, including comfort, inclusivity, and accessibility, to foster social activity and community engagement. These elements are further supported by the study's thematic framework. Key conclusions from the data include the following:

- **Street Seating and Active Social Behaviour** - Street seating facilitates a wide range of social activities, from solitary moments of relaxation to group gatherings. Social interactions, whether fleeting or enduring, are supported by seating configurations that encourage use and invite participation. The study confirms that spaces with well-placed, comfortable, and aesthetically appealing seating encourage people to linger, fostering stronger community ties and improving social engagement.
- **Aesthetical and Environment Influence** - Aesthetics and visual appeal play a critical role in how street seating is perceived and used. Survey data indicate that users are drawn to spaces where street furniture complements the surrounding environment, and enhancements such as modern designs, natural

elements, and improved lighting further elevate the experience. Street furniture that harmonises with its environment promotes a sense of identity and belonging, contributing to the overall success of urban spaces.

- **Safety and Accessibility** - Safety is a central concern in street seating design, particularly in relation to lighting, the surrounding environment, and ergonomic features. The study confirms that well-lit areas are more welcoming, reducing the fear of crime and promoting longer usage periods. Accessibility for all user groups, including those with disabilities, is another critical factor in ensuring that street seating meets diverse social needs.
- **Maintenance and Sustainability** - The durability and maintenance of street seating are vital for long-term functionality and sustainability. Proper maintenance schedules ensure the longevity of the seating, while minimising costs and addressing the aesthetic degradation that could otherwise deter usage. The study highlights the need for cost-effective, durable designs that require minimal upkeep but still meet the expectations of users and stakeholders.
- **Collaborative Design Approach** - One of the most significant conclusions from the participatory workshops is the value of involving users in the design process. By treating users as collaborators, the design process becomes more responsive to actual needs and preferences, resulting in street seating that better supports community well-being and social sustainability.

Overall, the findings reinforce the idea that well-designed street seating not only serves functional purposes but also plays a crucial role in improving social interaction, community engagement, and urban sustainability. By integrating aesthetic value, safety, and strategic placement with a focus on inclusivity and social behaviour, street seating can transform urban spaces into vibrant, active social environments.

5.8 Chapter Conclusion

The integration of four methodological approaches—walk-by observations, surveys, interviews, and participatory design workshops—proved essential in generating a comprehensive understanding of street seating design and its influence on active social behaviour. Although this process produced a large volume of data, including overlapping expressions and recurring concepts, the multilayered filtering and thematic analysis ensured that only the most meaningful insights were retained. This iterative refinement strengthened the reliability of the analysis and allowed the study to uncover deeper patterns that may not have been visible through any single method.

The use of preliminary keyword extraction followed by structured thematic consolidation was especially valuable. By cross-referencing the emergent themes with the study's three analytical pillars—**Product, People, and Space**—the research achieved a coherent synthesis that aligns user behaviour, design characteristics, and environmental context. This methodological rigor not only improved the clarity of the findings but also highlighted the interdependence between physical design features, user experiences, and social dynamics.

Ultimately, this chapter demonstrated how sustained triangulation across multiple data sources led to the identification of **five key design factors**, representing the central contribution of this research. These factors capture the essential considerations necessary to design street seating that is socially responsive, behaviourally supportive, and aligned with principles of social sustainability. Together, they form a robust foundation for developing a practical design framework to guide future street seating interventions.

The following and final chapter builds upon these findings to articulate the overall contribution to knowledge, present the implications for practice and policy, and outline recommendations that can inform the future design of socially sustainable urban public spaces.

CHAPTER 6

CONCLUSION & KNOWLEDGE CONTRIBUTION

6.1 Introduction

This chapter summarises the body of work included in this doctoral study. It elaborates on how the aims and objectives of the research were achieved and presents the overall conclusions drawn from this PhD research, synthesising the findings of the previous chapters. The limitations of the study are then discussed, and the contribution to knowledge is clearly articulated. The thesis concludes with recommendations for further research.

6.2 Thesis Summary

This section outlines the research activities conducted in this thesis, demonstrating how they align with the research aim. The research aims *"to develop an understanding of how street seating design in cities' public spaces might contribute to active social behaviour for social sustainability"*, explicitly focusing on street seating design.

Before addressing the main research aims, the author gathered two types of data: primary and secondary. The primary data requires an understanding of three interrelated elements presented in the Literature Review.

- Sustainability – what sustainability is, and in particular, what social sustainability means.
- Urban Public Space – the role of design in cities' public space, the benefits of public space to the public members, in particular of social interaction, public realm, active social behaviour.

- Street Furniture – the role of street furniture in public space, contributing to social sustainability, and in particular, the street seating design that emphasises active social behaviour.

At the end of primary data collection, a thematic framework for the street seating design approach and specifications was developed as a conceptual framework for the street seating audit indicator. This provides clear and understandable criteria for street seating design.

The next step was for the authors to begin the secondary data collection of:

1. walk-by observations,
2. surveys,
3. interviews,
4. participatory design workshops with both consumers and experts, and
5. validation of the contribution of knowledge.

Four research questions were formulated in the early stages to guide this study, and each serve as an objective to strengthen the research and the questions are:

1. How does current street seating design affect active social behaviour in UK urban centres, such as Manchester and Liverpool?
2. How do members of the public use street seating in UK city centres?
3. What are the essential components for driving active social behaviour via street seating design?
4. How might we develop recommendations to emphasise the importance of active social behaviour for social sustainability through street seating design?

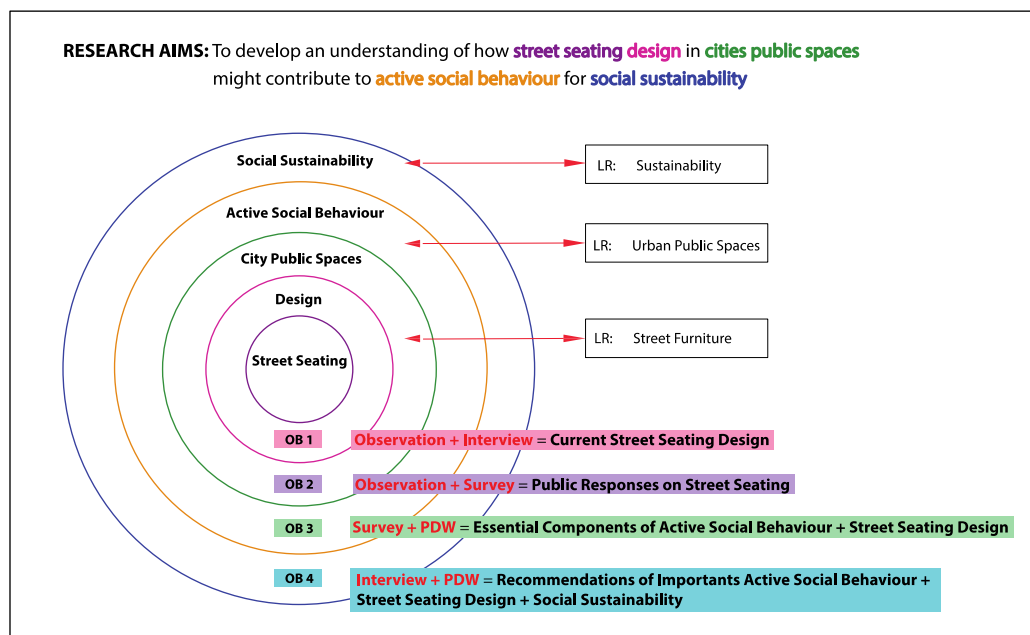


Figure 6-1: Relationship of The Research Findings

All methods used are of mutual interest; many keywords have emerged from this research investigation and are well organised within the three main themes of this research study: 'Products', 'Peoples' and 'Spaces'.

6.3 Findings Summary

The following section draws together the key conclusions from the findings and discussions throughout this thesis. The summary of findings reflects the results of the study. Before presenting the entire findings of this PhD study, the author would like to review the objectives of the study:

Research Objective

1. To apply observation and interview methods to explore *current street seating designs* in Manchester and Liverpool.
2. To employ observational and survey studies to understand *how public members use street seating* in UK city centres.

3. To utilise surveys and participatory design workshops to establish the *essential components that drive social behaviour via street seating design*.
4. To use participatory design workshop and interviews data to *develop recommendations that emphasise the importance of active social behaviour through street seating design for social sustainability*.

The above objectives were achieved with all the research methods used for this study, and keywords were found before refining them into themes. These themes were then organized under the main theme groups used by this study from the beginning.

Finally, to fill the study gap, the main factors sought have been identified, and the study has formulated five critical factors to improve and develop the design of street seating in urban public spaces that may contribute to active social behaviour for social sustainability. The table below presents a mapping of the main research findings.

METHODS	OBJECTIVES	KEYWORDS	THEMES EMERGED	MAIN THEMES	FACTOR THEMES (MAIN FINDINGS)
Observation + Interview	OB 1	Numbers of Seating, Vandalism, Poor Maintenance Schedule, Limited Space, Durability, Materials Selection, Lack Universal Design, Less Safety, Placement, Cost, Inappropriate Behaviour, Seating Proportion, Economical Friendly, Design, Other Amenities, Product Life Span	Material, Safety, Setting, Free Vandalism, Design, Location	Product Space	<ul style="list-style-type: none"> • SUSTAINABILITY • SECURITY • ACCESSIBILITY • DESIGN CHARACTER
Survey + Observation	OB 2	Placement, Surrounding, Universal Accessibility, Aesthetic, Offer More Seating, Public Transport, Well with Surrounding, City Image, 1-3hours, Hanging Out, Shopping, Busking, Campaigning, Multifunction (USB), Chair + Table, Exercising, Meeting Strangers, Safety, Family + Friends	Settings, Environment, Design, Aesthetically, Sociable Street, Type of Social Interaction, Type of People's Group	Product People Space	<ul style="list-style-type: none"> • DESIGN CHARACTER • ACCESSIBILITY • CONNECTIVITY • SUSTAINABILITY • NODES • SECURITY
Survey + PDW	OB 3	Accessible Entrance, Surrounding + Atmosphere, Offer more Seating, Elderly + Kids, Open Spaces, Families, Group of Friends, Safety Surrounding, Design Trend, Comfort, Ergonomics, Design Guideline, City Image, Configuration, Amenities, Form, Colour, Texture, Universal Accessibility	Location, Environment, Settings, Safety, Design, Type of People's Group, Aesthetically, Sociable Street	Product People Space	<ul style="list-style-type: none"> • ACCESSIBILITY • DESIGN CHARACTER • SECURITY • SUSTAINABILITY • NODES
PDW + Interview	OB 4	City Identity, Living Healthy, Support Social Activities, Design Trend, Cultural and Heritage, Small Talk, Short Contact, Universal Design/ Accessibility, Public Needs,	Aesthetically, Active Social Product Behaviour, Sociable Street, People Material, Type of Social Interaction,	Product People Space	<ul style="list-style-type: none"> • SUSTAINABILITY • NODES • ACCESSIBILITY • SECURITY • DESIGN CHARACTER

Table 6-1 Mapping of The Main Findings Summary

6.4 The Emergence of Five Critical Factors

According to the previous table, this study has identified and formulated five key factors: 1) **Security**, 2) **Accessibility**, 3) **Sustainability**, 4) **Nodes**, and 5) **Design Characters** to enhance and develop Active Behaviour for Social Sustainability through Street Seating Design in Urban Public Spaces. Each of the ring represents the factors derived prior to the entire research, supported by previous scientific research, experts, and protocols adopted from other countries.

READ: Each of the ring are not in the same groups or categories however, they are connected to each other from the first three main pillars to last ring of the five key factors. Hence, this results in different colours of each ring also explain the non-connected line around it.

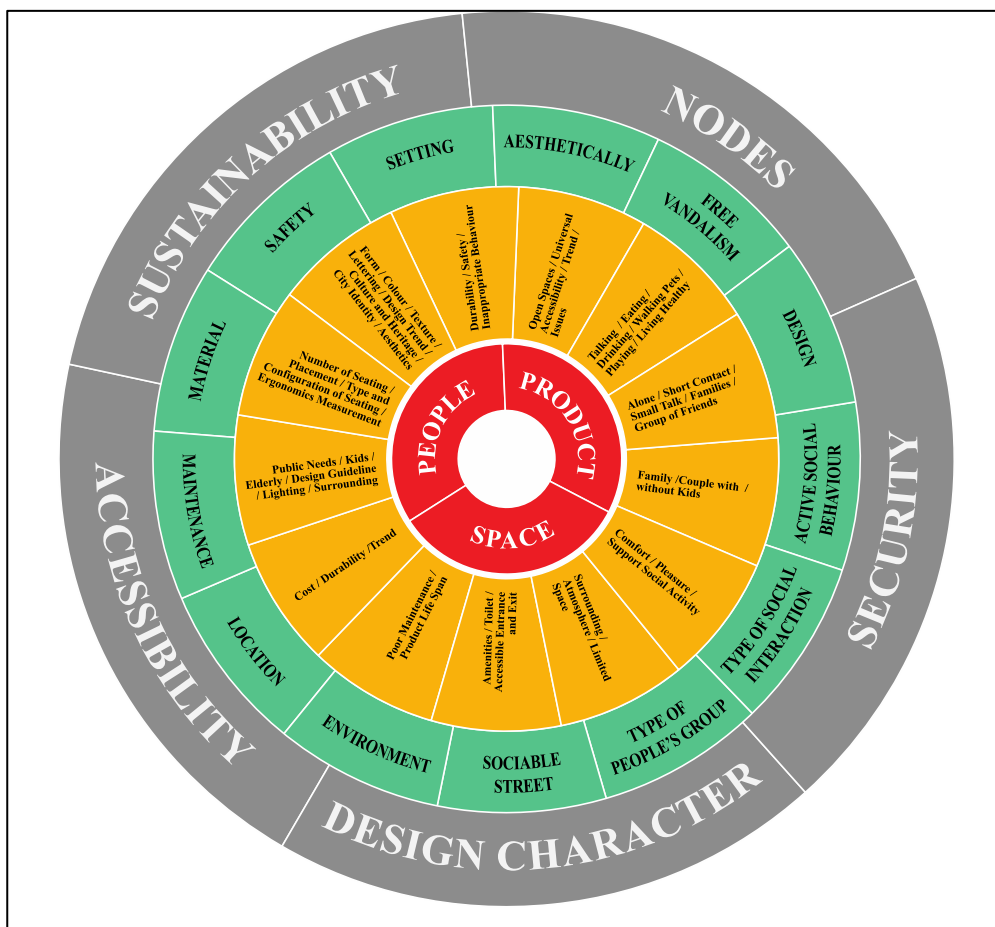


Figure 6-2: The Emergence of Five Critical Factors for Street Seating Design Factors for Active Social Sustainability in Urban Public Spaces

6.5 Validation Discussion

The results of this study confirm that multiple factors influence social activities in street seating. Designers must be aware of users' diverse needs and expectations to support active social behaviours effectively. This research highlights that street seating enhances individual well-being by encouraging people to stay longer and engage in socially active behaviours. To ensure the findings align with the street seating design process, the study included validation with experts through interviews and validation questionnaires. This approach helped confirm the relevance and applicability of the findings in real-world scenarios.

Moreover, this study underscores the importance of social sustainability in addressing risks and solving social issues. The research agrees that efforts to achieve sustainability can falter without socially oriented practices, highlighting the gaps between theory and practice. By bridging these gaps, the study advocates for designs that meet aesthetic and functional needs and promote social well-being and sustainability in urban public spaces. This refined paragraph presents the study's conclusions and emphasises the practical implications and validation of the findings, stressing the importance of socially oriented design practices.

6.5.1 Ten experts from various backgrounds were recruited for this validation.

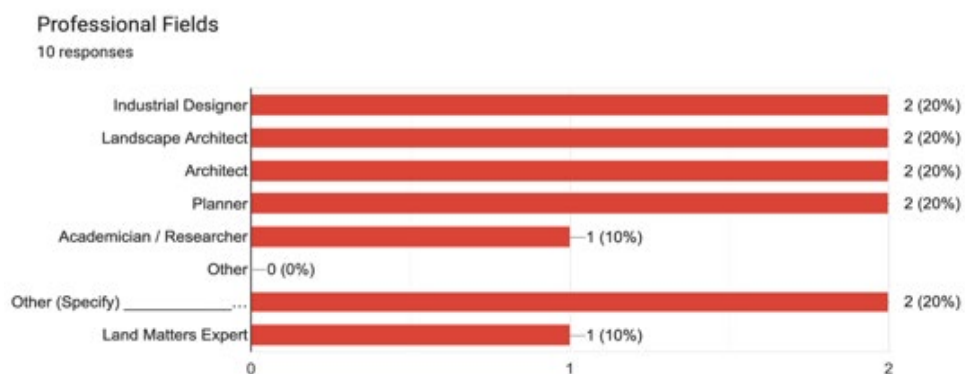


Figure 6-3: Demonstrates that certified experts from diverse backgrounds relevant to the current study carried out this validation.

6.5.2 The Frequent Words and Phrases

B1 - These frequent words and phrases highlight the primary considerations for professionals working on street seating design to foster active social behaviour in urban public spaces.

Comfort	Mentioned multiple times as a key factor in attracting visitors and encouraging relaxation and interaction.
Accessibility	Highlighted as essential for making seating available to diverse users and promoting equal access.
Flexibility	It is important to allow seating arrangements to accommodate different group sizes and activities.
Aesthetics	Emphasised for drawing people in and fostering social interaction.
Functionality	Mentioned in the context of ensuring that seating is durable and functional.
Safety	Referred to in terms of the seating serving its intended purpose.
Durability	Related to the seating's ability to withstand outdoor elements and frequent use.
Urban Landscape	The design should blend with the urban environment to create a cohesive sense of place.
Adaptability	The ability to change and accommodate future community requirements and preferences.
Economics	Considered in terms of the economic viability of the seating design.
Sustainability	Mentioned in the context of creating sustainable and durable seating solutions.

Table 6-2: Key Terms Reflecting Core Priorities in Street Seating Design for Promoting Active Social Behaviour

6.5.3 The Details of the Discussion

B2i – Sustainability

***B2i-a:** These are all the words derived from the expert's concerning "Sustainability" as one of the critical factors (materials and practices) in planning and designing new street seating installations.*

<i>"Very Important"</i>	<i>"Highly Crucial"</i>	<i>"Very Critical"</i>
-------------------------	-------------------------	------------------------

B2i-b: *The List shows the sequence of sustainable design principles that experts prioritised for street seating to encourage social sustainability and interaction in urban areas.*

Seating	Sustainable	Design
Principles	Inclusivity	Flexibility
Durability	Environmental	Community
Interaction	Urban	Materials
Comfort	Safety	Natural

Table 6-3: Essential Principles for Street Seating in Urban Design

The analyses show that by prioritising these principles, experts aim to create street seating that not only enhances the urban landscape but also promotes social interaction, community engagement, and sustainability. These elements combined can significantly contribute to the social sustainability of urban public spaces, fostering active and inclusive social behaviours. By emphasising seating first, experts highlight the importance of comfortable, accessible, and strategically placed seating to invite users to engage with the urban environment and with each other.

B2i-c: *“YES ABSOLUTELY” – Most of the experts reflects in concurring that sustainability is vital in the initial planning of new street seating designs to promote social interaction and enhance social sustainability?*

1. **Environmental Impact:** Using sustainable materials and production methods reduces pollution and resource consumption, leading to cleaner and healthier public spaces.
2. **Durability and Longevity:** Designing for durability ensures that street seating remains functional and safe for longer periods, reducing the need for frequent replacements and conserving resources.

3. **Economic Benefits:** Sustainable designs can support local economies by using local materials and considering the product's lifecycle, which also helps lower long-term maintenance costs.
4. **Social Engagement:** Durable, low-maintenance seating makes public spaces more inviting, encouraging people to spend time outdoors, connect with others, and foster community and belonging.
5. **Aesthetic and Functional Appeal:** Well-designed, sustainable seating enhances public spaces' visual and functional quality, making them more attractive for socialising and relaxation.

It shows that the above criteria can be grouped into the five originally developed factors; however, “community engagement” was suggested as crucial, as it provides valuable information about which features and designs best serve their needs. The current study agrees that experts see community engagement not just as a factor but as a fundamental process that promotes social interaction and sustainability. By involving the community, designers can create more relevant, inclusive, and well-maintained street seating, thereby fostering a vibrant and interactive urban environment. Ultimately, sustainability is crucial in the initial planning of new street seating designs because it enhances environmental health, economic efficiency, social engagement, aesthetic appeal, and community involvement. This aligns with the five key factors of sustainability, accessibility, nodes, design character, and security proposed in this thesis.

B2ii: Nodes

B2ii-a: “Yes, very crucial” as Strategic Placement of Street Seating

The strategic placement of street seating is crucial in creating social nodes or hubs, fostering community interaction, and encouraging active social behaviour in urban public spaces.

Here is how experts share their opinions and how it has analysed the five initial factors.

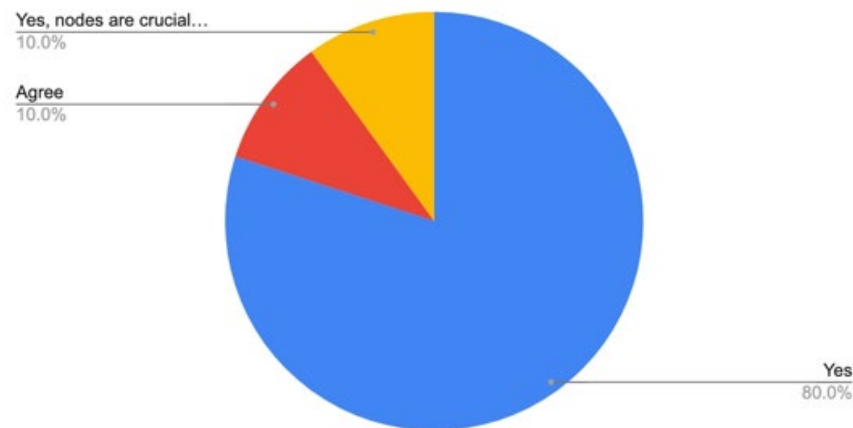


Figure 6-4: Consensus on the Vital Role of Sustainability in Planning Street Seating to Enhance Social Interaction

B2ii-b: The criteria for considering the 'nodes' factor as a critical element in the early stage of designing street seating for urban public spaces include:

1. **High-Traffic Areas:** Nodes are natural gathering points that attract many people, maximising the use of seating and opportunities for social interactions.
2. **Closeness to Amenities:** Place seating near shops, bars, restrooms, and other amenities, which makes it more convenient and enjoyable for users. This also attracts tourists and supports local businesses, contributing to the local economy.
3. **Safety and Visibility:** Ensuring that seating areas are safe and visible increases user comfort and encourages more people to use the seating.
4. **Significance in Culture and Recreation:** Positioning benches near landmarks, parks, and culturally significant areas can enhance cultural and recreational experiences, indirectly promoting community engagement.

These criteria help ensure that street seating installations meet practical needs and contribute to the social fabric and overall quality of life in urban environments.

B2ii-c: “AGREE/YES” that the nodes are one of the most significant variables to consider.

80% of experts unequivocally agree that nodes are crucial in urban design, highlighting their importance in creating functional and vibrant public spaces. Additionally, smaller segments (10% each) provide further affirmation, with variations in the intensity of agreement, reinforcing the centrality of nodes in fostering social interaction and enhancing the usability of urban environments. This strong consensus underscores the pivotal role nodes play in effective urban planning and design.

B2iii – a. Security

Balance should be achieved between security requirements and the design of welcoming, people-centric public seating areas within an urban environment are,

1. **Prioritising Safety:** Implementing security measures such as well-lit areas, clear sightlines, and open layouts to enhance visibility and reduce criminal activities.
2. **Incorporating CPTED Principles:** Using Crime Prevention Through Environmental Design (CPTED) concepts to address security issues while maintaining a people-centric design.
3. **Creating a Welcoming Atmosphere:** Including elements like comfortable and sturdy seating, plants, and public art to make the space feel positive and inviting.
4. **Balancing Design and Security:** Ensuring that security measures do not make the space feel restrictive or unwelcoming, promoting community interaction and involvement.

From an analytical standpoint, it is evident that experts advocate for a holistic approach where security and user experience are not viewed as mutually exclusive but rather as complementary elements. The current study suggests that this expert perspective is critical in ensuring that urban spaces remain vibrant and accessible, while still addressing the essential need for security.

B2iii – b.

Security features can be successfully integrated into street seating in urban public spaces to encourage social interaction by adopting a balanced and strategic approach. Here are some key methods summarised from the expert's feedback:

1. Use of Technology:

- **AI and GPS Monitoring:** To enhance security, implement AI systems and GPS monitoring. These technologies can help in real-time monitoring and quick response to any incidents.
- **Panic Buttons:** Install panic buttons connected to the nearest police stations for immediate emergency assistance.

2. Design and Materials:

- **Sturdy, Vandal-Resistant Materials:** Use durable materials that resist vandalism and unauthorised use. This ensures that the seating remains attractive and functional over time.
- **Anchored Structures:** Securely anchor seating structures to prevent them from being moved or damaged, maintaining their integrity and usability.

3. Natural Surveillance:

- **Visibility:** Design seating arrangements that allow people to see and be seen. This natural surveillance helps deter criminal activities as more eyes on the street increase the likelihood of spotting and reporting suspicious behaviour.
- **Crowded, Prominent Spaces:** Place seating in well-trafficked and visible areas to enhance safety and community.

4. Lighting:

- **Proper Lighting:** Install adequate lighting around seating areas to improve visibility during the evening and nighttime. Well-lit areas make people feel safer and more comfortable, encouraging them to use the space.

5. Emergency Features:

- **Emergency Call Boxes:** Add emergency call boxes near seating areas. These boxes provide a direct line to emergency services, enhancing users' sense of security.

6. Inclusive Design:

- **Inviting Environments:** Create inviting and inclusive environments where people feel comfortable gathering and interacting. This can be achieved by combining aesthetic appeal with functional security features.
- **Comfortable Seating:** Ensure that the seating is comfortable and conducive to social interaction, encouraging people to spend more time in the space.

Experts understand that integrating security features into street seating in urban public spaces requires a balanced approach. They recognize the importance of using advanced technology, durable materials, natural surveillance, and proper lighting to create safe yet inviting environments.

From an analytical perspective, the current study notes that experts emphasise harmonising security with user experience. The strategic use of technology and design ensures safety without compromising the space's welcoming nature. The focus on visibility and well-trafficked areas highlights the role of social interaction in enhancing security. The current study agrees that this approach effectively combines security to foster community engagement in urban spaces.

***B2iii – c.** Security measures are crucial in planning a new street seating design to create inviting urban environments that promote active social behaviour and sustainability.*

YES, as urban vitality refers to urban areas' dynamic and lively quality, characterised by active social interactions, thriving economic activities, cultural vibrancy, well-utilized public spaces, and inclusivity. Therefore, incorporating security measures, inclusivity, and community resilience into new street seating designs is critical for establishing welcoming urban environments that encourage active social behaviour and sustainability.

B2iv-a. Accessibility

The interrogation of accessibility into street seating design to enhance the city inclusivity and usage, fostering an inviting setting for social interaction and sustainability. Integrating accessibility into street seating design enhances city inclusivity and usage in several keyways:

1. Inclusivity for All:

- **Welcoming Effect:** Accessible seating invites everyone, including those with disabilities and the elderly.
- **Diverse Participation:** Encourages broader use, fostering community and belonging.

2. Encouraging Social Interaction:

- **Community Engagement:** Promotes interaction among diverse groups, enhancing public involvement.
- **Sense of Belonging:** Creates an inclusive environment where everyone feels they belong.

3. Functional and Sustainable Public Spaces:

- **Optimised Use:** Allows more people to use public spaces, enhancing functionality and sustainability.
- **Long-lasting Design:** Contributes to durable and sustainable urban environments.

4. Design Features for Accessibility:

- **Inclusive Elements:** Ramps, wider paths, and adjustable seats ensure accessibility for all.
- **Ease of Access:** Ensures Street seating is well-utilized by the public.

5. Enhanced City Popularity:

- **Increased Usage:** Makes seating more popular and contributes to city vibrancy.
- **Social and Environmental Benefits:** Supports social interaction and sustainability.

Integrating accessibility into street seating design is essential for creating inclusive, functional, and sustainable urban environments. This ensures public spaces are

welcoming and usable for everyone, enhancing inclusivity, social interaction, and overall usage.

B2iv-b. The expected challenges that might arise when integrating accessible features into street seating and affect the promotion of active social behaviour in public spaces.

The primary challenges in integrating accessible features into street seating include:

1. **Limited Space:** Finding sufficient space to accommodate accessible features can be difficult, especially in crowded urban environments.
2. **Financial Constraints:** Budget limitations can result in suboptimal accessibility features and challenges in implementing high-quality, inclusive designs.
3. **Regulatory Compliance:** Ensuring all accessibility guidelines and regulations are met can be complex and costly.
4. **Design Complexity:** Creating functional and aesthetically pleasing designs while incorporating accessible features requires careful planning and expertise.
5. **Maintenance and Vandalism:** Ensuring that accessible features remain functional and clean over time can be challenging due to potential vandalism and the need for regular maintenance.

The current study concurs that experts understand the challenges in integrating accessible features into street seating.

B2iv-c. Here are examples of urban areas where accessible street seating has promoted social activities and sustainability:

Federation Square, Melbourne, Australia

- **Federation Square, Melbourne:** This area offers a variety of seating options, hosts regular cultural events, and is well-integrated with public transport.

Camden Market, London, UK

- **Camden Market, London:** Features accessible seating, a vibrant mix of shops and food stalls, and regular events that draw diverse crowds.

Manly, Sydney, Australia

- **Manly, Sydney:** Accessible Street furniture along pedestrian paths and parks, promoting social interaction and outdoor activities.

SOGO Mall, Kuala Lumpur, Malaysia

- **SOGO Mall, Kuala Lumpur:** The entrance steps have evolved into a social space with natural seating terraces, hosting community activities like busking and open-speech stages.

B2v. Design Character

Adding unique and culturally reflective features to street seating in urban open spaces fosters a sense of identity and community by creating inviting, recognisable areas that encourage social interaction and prolonged use. The frequent words in the text include:

KEY CONCEPT	DESCRIPTION
Accessibility	Highlighted as essential for making seating available to diverse users and promoting equal access.
Community	Highlights fostering a sense of belonging and social interaction.
Identity	Refers to creating a recognisable and memorable space that reflects local culture and values.
Seating/Flexibility	Central to the discussion, focusing on the design and functionality of street furniture, accommodating different group sizes and activities.
Gather/Interact	Indicates the social aspect of these spaces, encouraging people to come together.
Design/Aesthetics	Pertains to the artistic and functional aspects of street seating, drawing people in and fostering social interaction.
Comfortable/Inviting	Key factor in attracting visitors and encouraging relaxation and interaction, enabling prolonged use.
Public Spaces	The context in which these seating designs are implemented.
Socialise/Connections	The outcome of people using these spaces, leading to community building.
Memorable/Recognizable	The impact of unique designs on the perception of the space.

Connections/Belonging	The outcome of people using these spaces, leading to community building.
Safety	Mentioned in the context of ensuring that seating is durable and functional.
Economics	Considered in terms of the economic viability of the seating design.

Table 6-4: Core Priorities in Street Seating Design: An Overview of Key Concepts and Their Impact on Social Behaviour in Urban Public Spaces

Incorporating design elements like curved and adaptable seating, greenery, public art, and weather-resistant materials in street seating fosters social interaction and enhances the social sustainability of urban areas, as outlined in Table 6.4 above. On the other hand, experts also mentioned key considerations for designing street seating in urban public spaces. It emphasises the importance of thoughtful **layout and arrangement**, such as group seating and adaptable options, to promote social interaction. **Materials and comfort** are crucial, with weather-resistant and comfortable seating encouraging longer stays. **Environmental enhancements** such as shade, shelter, and the integration of greenery add visual appeal and comfort. **Visual and cultural elements** are also essential, with public art and cultural themes fostering a sense of place. The table underscores the need for **inclusivity and accessibility**, ensuring seating options cater to all users. Lastly, **safety and security** are prioritised to create welcoming and secure seating areas.

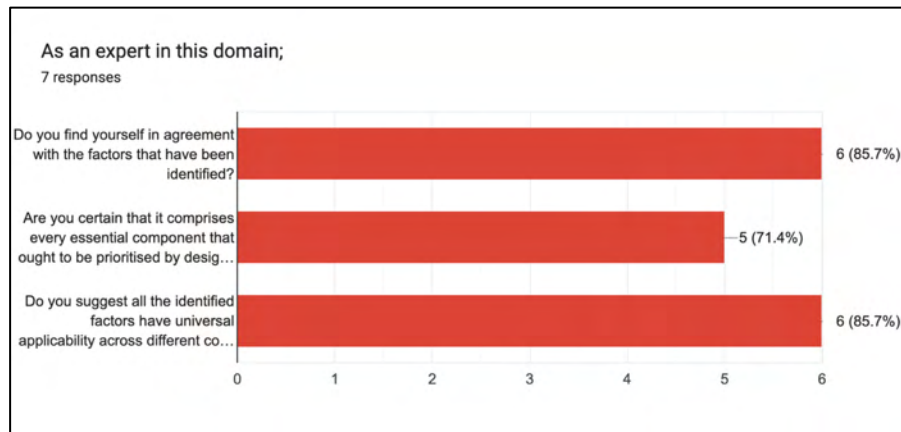
Eventually, all these categories encapsulate the core design elements that make street seating effective in promoting social interaction and supporting the social sustainability of urban areas. The current study agrees with experts' perspectives regarding all the keywords, and it concludes that well-designed street seating can significantly foster a stronger sense of community ownership and engagement in several ways.

1. **Aesthetic Appeal and Attraction:** Visually appealing and unique seating designs naturally attract people. When residents find a space attractive, they are more likely to use it frequently. This repeated use fosters a sense of familiarity and attachment to the area.

2. **Encouraging Prolonged Engagement:** Attractive and comfortable seating encourages people to linger longer in public spaces. This extended presence allows for more opportunities for social interactions, conversations, and shared experiences, which are fundamental to building community bonds.
3. **Creating Focal Points for Social Interaction:** Well-designed seating areas often become natural gathering spots. These spaces serve as informal hubs where people can meet, socialise, and engage in group activities. Such communal areas promote regular social contact among residents, strengthening social ties.
4. **Promoting Local Cultural Values:** Incorporating local cultural elements into the design of street seating can enhance the sense of place and identity. When residents see their cultural values and aesthetics reflected in public spaces, they feel incredible pride and ownership over their community.
5. **Enhancing the Urban Landscape:** Well-designed seating beautifies urban spaces and makes them more inviting and memorable. An attractive urban environment encourages people to take pride in their surroundings, fostering a collective sense of responsibility for maintaining and improving the community.
6. **Facilitating Informal Gatherings:** Street seating that is strategically placed in high-visibility areas can serve as a venue for informal gatherings and community events. These interactions are crucial for building a cohesive community where residents feel connected and engaged.

Therefore, well-designed street seating enhances the visual and functional quality of urban spaces, making them more inviting and promoting social interaction. This, in turn, fosters greater community ownership and involvement, as residents feel more connected to and responsible for their shared environment. The diagram below shows three crucial questions with the significance percentages of experts' views before the validation process concluded.

6.6 Experts Validation of the Proposed Design Factors



- i. **Agreement on Identified Factors:** Most experts (85.7%) agree with the factors identified in this study. This shows strong validation from domain experts, suggesting the factors are well-founded and relevant.
- ii. **The comprehensiveness of components:** 71.4% of experts believe that the study includes all essential components that should be prioritised. This reflects a high level of confidence in the study's thoroughness, although there may be room for further exploration or clarification of specific areas components.
- iii. **Universal Applicability:** 85.7% of experts indicate that the identified factors are applicable across different contexts. This implies that the study's findings are generally relevant and can be used in various settings, increasing the study's impact and significance.

6.7 The Five Governing Factors of Socially Sustainable Street Seating Design

Drawing on the findings from all four methodological stages and strengthened by expert validation, the final governing factors of socially sustainable street seating design are outlined below.

I. Security in Urban Street Seating Design

Balancing security requirements with the design of welcoming, people-centric public seating areas is crucial to promoting social interaction and sustainability in urban environments. Experts recommend a holistic approach that integrates security with user experience, ensuring safety measures do not make the space feel restrictive or uninviting. Key strategies include using durable, vandal-resistant materials, proper lighting for visibility, natural surveillance through seating placement in high-traffic areas, and incorporating technology like AI and GPS for real-time monitoring.

Incorporating Crime Prevention Through Environmental Design (CPTED) principles ensures that urban seating promotes safety while fostering community interaction. Additionally, creating a welcoming atmosphere with comfortable seating, plants, and public art enhances the appeal of these spaces without compromising security. This balanced approach allows for a dynamic urban environment where people feel safe, supported, and encouraged to engage socially, contributing to the vitality and sustainability of public spaces.

II. Accessibility in Urban Street Seating Design

Integrating accessibility into street seating design is essential for fostering inclusivity, social interaction, and sustainability in urban public spaces. Accessible seating allows individuals of all abilities, including the elderly and those with disabilities, to engage with public spaces, enhancing city inclusivity and usage. Strategically placed, accessible seating encourages broader participation, community engagement, and a sense of belonging, promoting active social behaviours.

Key features of accessible design include ramps, wider pathways, and seating that accommodates all users, ensuring functional and inviting public spaces. Accessibility also contributes to the vibrancy of urban areas by increasing public space usage and fostering social and environmental benefits. However, challenges such as limited space, financial constraints, and the complexity of adhering to regulations and maintaining accessible features must be addressed to ensure effective design implementation.

Examples of urban areas where accessible street seating has successfully promoted social interaction and sustainability include Federation Square in Melbourne, Camden Market in London, and Manly in Sydney. These areas combine accessibility with vibrant social settings to enhance urban life.

III. Sustainability is a fundamental principle in urban street seating design

Sustainability is a fundamental principle in urban street seating design, intertwining environmental responsibility, economic efficiency, and social well-being. Experts emphasise that sustainable materials, durability, and community engagement are crucial in creating functional, aesthetically appealing, and inclusive public spaces. This approach minimises environmental impact through resource-efficient practices and ensures long-term functionality, reducing the need for frequent replacements and fostering economic benefits. Social sustainability is equally significant by addressing community needs and fostering social interaction. It involves providing comfortable, accessible, and well-maintained seating that enhances the overall experience of urban spaces. By involving local communities in the design process, street seating can better meet the social and cultural needs of the area, ultimately contributing to a more vibrant and sustainable urban environment. These considerations align with broader sustainability goals, which prioritise environmental health, community engagement, and the preservation of cultural heritage in urban design.

IV. Nodes as a Strategic Element in Urban Street Seating Design

As strategic gathering points, nodes are critical in enhancing the usability and vibrancy of urban public spaces. Defined as high-traffic areas where people naturally

congregate, nodes offer opportunities for social interaction, contributing to the overall social fabric and quality of life in cities. Street seating placed at nodes encourages active social behaviours by facilitating community interaction in spaces that are accessible and inclusive.

Experts agree overwhelmingly (80%) on the importance of nodes in urban design, particularly in their ability to foster engagement by positioning seating near cultural landmarks, amenities, and recreational areas. This strategic placement boosts social engagement, supports local economies, and enhances user safety and comfort. Nodes connect people physically and socially, making them crucial elements in urban planning for functional and cultural reasons. By incorporating street seating into these vibrant hubs, urban designers can promote sustainable social interaction and ensure that public spaces remain lively, functional, and welcoming.

V. Design Character in Urban Street Seating

Incorporating unique, culturally reflective, and aesthetically appealing features into street seating in urban areas fosters a sense of identity, community, and prolonged engagement. Design character is pivotal in creating inviting and recognisable public spaces encouraging social interaction. Experts highlight key design concepts such as accessibility, community engagement, identity, flexibility, and aesthetics as essential components for fostering social connections and a sense of belonging.

Well-designed seating enhances the urban landscape by integrating elements such as weather-resistant materials, flexible seating arrangements, greenery, and public art. This makes public spaces more attractive and comfortable for prolonged use. Including cultural and local heritage themes further deepens the connection between the space and its users, promoting community pride and ownership.

Street seating design can significantly strengthen community bonds by encouraging prolonged engagement, facilitating social gatherings, and promoting local cultural values. Aesthetic appeal, functional design, and inclusivity ensure that street seating contributes to the social sustainability of urban spaces and a stronger sense of community identity and interaction.

6.8 Contribution to Knowledge

This research set out to investigate how street seating can shape, support, and amplify active social behaviour in urban public spaces. Through a comprehensive, multi-method exploration of real environments, user experiences, professional perspectives, and participatory insights, the study has revealed that street seating is far more than a functional amenity but also it is a critical social infrastructure. The integrative analysis across four methodological strands has produced a nuanced understanding of the behavioural, spatial, and design conditions that enable socially sustainable public life. These insights culminated in a coherent set of five design factors for street seating that clarify how urban seating can be intentionally designed to foster meaningful social interaction and enhance the liveability of city environments. The contribution to knowledge has been divided into two categories: industrial practitioners and academic scholars.

6.8.1 Contribution to Industry and Practice

Supporting Urban Designers, Planners, And Policymakers

The five design factors translate complex behavioural and spatial insights into **clear design principles** that can be directly adapted and applied in other countries (suit with cultural adjustments).

- Industrial design or urban design practice,
- public space planning,
- street furniture procurement,
- local authority guidelines and standards.

Offering actionable design guidelines

The framework identifies:

- **intended beneficiaries** (across age groups, abilities, cultural backgrounds),
- **stages of application** in the design and planning process,
- **context-specific considerations** for diverse urban settings.

This ensures that design recommendations are not generic but **usable, targeted, and operational**, allowing practitioners or stakeholders to embed social sustainability goals early and consistently.

Enhancing public realm quality and inclusivity

By showing how design choices influence for active social behaviour, the research empowers high value insights to practitioners in terms of:

- create more inclusive seating,
- support community interaction,
- improve urban well-being,
- increase footfall and vibrancy in city centres.

This positions the framework as a **policy-ready reference** for improving urban public spaces in all cities and beyond.

6.8.2 Contribution to Academic Scholarship

Expanding the theoretical scope of the Triple Bottom Line (TBL)

While TBL framework is widely used, the **social dimension (“people”)** remains **underdeveloped** in street furniture research. This study fills that gap by:

- demonstrating how street seating directly mediates social interaction;
- showing how physical design influences social behaviour, comfort, inclusivity, and cultural participation;
- offering a socially oriented reinterpretation of TBL for urban public space design.

Providing a replicable mixed-method model

The study shows how **four-source data triangulation** can uncover user-driven insights often missed in conventional design studies, offering a methodological contribution that can be replicated in:

- cross-cultural research,
- comparative city studies,
- future work on social sustainability and public life.

Offering a publishable foundation for further scholarly work

The conceptual framework and five design factors provide a strong basis for:

- journal articles on public space design and social sustainability,
- conference papers in urban industrial design, architecture, and human–environment and social interaction,
- future theoretical debates on behavioural design and user-centred street furniture.

The novelty and clarity of the findings position the research to contribute meaningfully to the academic discourse.

Overall, this research moves beyond merely describing the challenges of street seating design; it **redefines the role of street seating as a catalyst for social sustainability, offering both theoretical clarity and practical solutions**. The outcomes support more liveable, socially engaging, and culturally responsive urban spaces, establishing a foundation for future innovation in urban public realm design. Figure 6.5 illustrates the contribution to knowledge of this study.

5 Critical Factors

for Active Social Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces

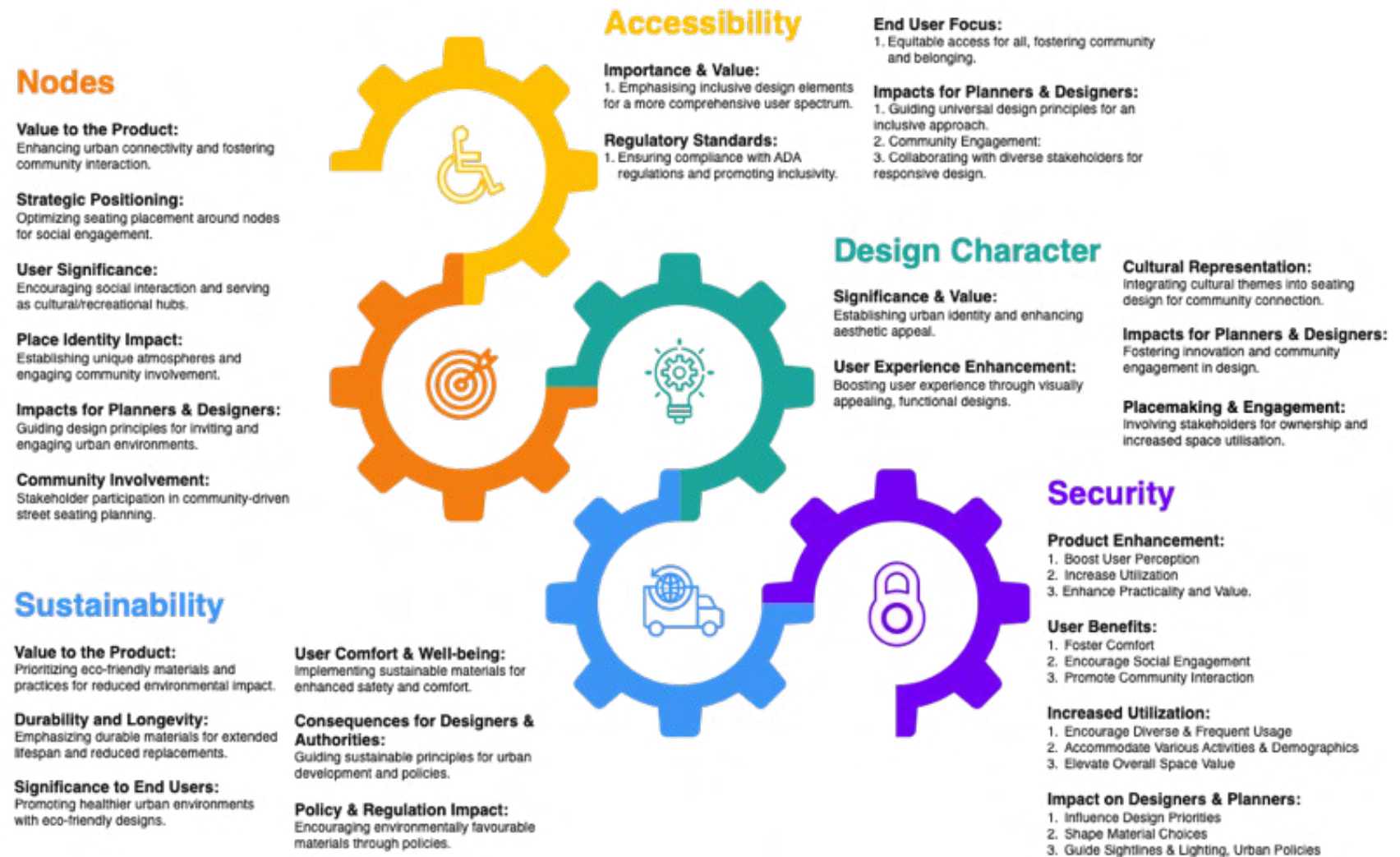


Figure 6-5: Illustrates The Contribution to Knowledge of This Study

6.9 The Details of Each Critical Factors

6.9.1 Security

In general, there are two streams of knowledge that street seating design can contribute to improving security factors by end users: 1) by implementing behavioural science insights into street seating design and 2) by developing practical training for end users (behavioural change campaign and intervention). The goal of security through behavioural design is to design the system so that street seating users are most likely to behave appropriately and avoid vandalism.

In terms of the "Safety" design of street furniture, especially street seating, there should be ergonomic safety measures for users, including children, the elderly, and the disabled. It should also extend the safety and durability aspects of street seating and street furniture around the venue. In addition, providing clear visual and textual design guidelines to facilitate its use is also helpful, and, finally, environmental safety factors such as lighting to illuminate the place must also be available.

Meanwhile, in the Australian Design Protocol (Stace, 2011) and other countries, "Safety" is a design factor for public safety to ensure people feel safe and secure in public places, even at night or when walking alone. Roads and sidewalks are safe for all audiences, including adults, children, or the elderly, walking alone or cycling. A safe place does not show signs of damage, such as lousy graffiti, abandoned places, and litter.

6.9.2 Accessibility

Accessibility is a factor that refers to the ability to reach a place or destination and represents the pattern of pedestrian movement in the city's public spaces. Accessibility is based on the social relations connecting one place with another in the urban system. Places directly linked to the rest of the environment are more accessible and tend to attract more people, making the area busier. The built environment must be accessible for the desired and intended use and, where necessary, inaccessible to undesired use.

The accessibility of public spaces is primarily determined by urban planning design. It is about accessibility, for instance, public space facilities like streets and parks. Easily accessible streets or parks are usually busier than less accessible ones. Furthermore, the rule applies regarding social security: “More people on the street = more eyes on the street = more social control” (Jacobs, 1992).

Other than spaces, street seating or rest areas must also be suitable for all types of groups of people. The street seating must be practically accessible to facilities such as shops, toilets or public transport and easy access to all entrances and exits. Accessibility significantly improves the lives of groups of people and can be the best practice for all public members.

6.9.3 Sustainability

Sustainability is a broad concept; it covers the context of the environment and economics, where people are urged to enhance economic productivity and living affordability while fostering environmental responsibility to maintain natural resources. However, for this study, the sustainability factor includes a sense of community and place attachment to enhance civility. Apart from concern for the environment, especially in the materials selection, product life span, and cost efficiency, this factor suggests maintaining and improving the well-being of current and future generations. According to the Youth Foundation, social sustainability is defined as creating a sustainable place in its framework for creating a new community. It promotes well-being by understanding the community's needs (Woodcraft et al., 2012). Therefore, street furniture should include all the above, and social sustainability should be supported by providing a comfortable and pleasant place around it and its atmosphere. This practice helps to create a sustainable environment. Sustainability should also address all overall designs in line with the latest trends without compromising the city's heritage and culture.

Eizenberg & Jabareen (2017) defined social sustainability as “the close relationship between the neighbourhood and the people who live there”. There are various physical factors related to social sustainability, such as social sustainability outcomes in urban

planning and design principles, such as congestion, density, and greenness. The results of the current study observation also show the issue of congestion and greenery. Sound and tangible planning principles are commonly linked to many of these factors; however, often, they disregard the factors' contribution to social sustainability.

Therefore, additional features are essential to achieve social sustainability, including the necessary social processes and structures that will emerge in communities and ensure their satisfaction, which is constantly changing. It is time for local authorities, designers, or planners to step up the initiatives to ensure the continuity of their street furniture, including raising civic awareness to reduce costs and meet legal requirements for energy emissions and efficiency. It also gives street furniture users and the general public awareness of the importance and benefits of mental and physical recycling (Peyman & Gökçen Firdevs, 2014). These changes should enhance the local economy, environment and community.

6.9.4 Nodes

The public realm in urban design consists of places accessible to all, and it has the most significant impact on the physical environment and quality of urban life. Lynch (1960) introduced urban design elements from his research, and his node is one of his five urban elements that serve as a research tool for urban information. In the context of this research, nodes are essential factors because nodes are defined as strategic places in the city or a collection point in the city where the observer can enter and intensively focus on where he goes, which serves as the "focal point" of the city itself. A node is a point that connects physically and socially; it works as a strategic and vital place that is an intensive focus in the city, and it can be the focus or intersection of new public space developments.

Nodes guide users to crowded places where people congregate, vibrant places with people around, whether doing business, working, hanging out, shopping, socialising, or many other activities. It helps to ease the movement and access between a network of places and spaces. Furthermore, public spaces are nodes of social interaction because nodes can form community bonds in various activities, and they should be

friendly. Therefore, street furniture, especially street seating, can add value to community socialisation. In the context of this research, nodes are highlighted on active social behavioural [activities of people], types of social interactions, and types of groups or categories of people.

6.9.5 Design Character

It is essential to recognise that every place has characters, and not all characters are positive. When studying a character, it is basic to focus only on the positive aspects that work well and seem appealing. While that is important, it is not the only technique used. Since much of the urban design process concentrates on improving the place, role character analysis is a vital tool in helping to highlight the history or identity of an area (Black et al., 2017). The factor should design the character or identity of street furniture or street seating to provide comfort and convenience in its environment and atmosphere to foster a connection between the place and the audience in support of social activities.

The configuration of every piece of street furniture, especially street seating, should be practical and stylish. Applying Inclusive Design and considering heritage and cultural sites adds value to the community and fosters a socially inclusive society. The character of the design should support ongoing activity on the street through engaging visual details, usability, and convenience. The look and feel of an area include the activities that occur there. Areas characterised by common features are physically and socially interconnected; people feel linked to the environment (heritage and culture) and the surrounding area, welcoming social engagement, proximity to shops or facilities offering services, and various public transport options, including walking and cycling.

6.10 Integrated Interpretation of the Five Factors

Each of these cities needs to appear robust, developed, and possess a strong character, which can partly be achieved through proper planning and design, including the urban public realm or microarchitecture. The shopping mall usually functions as the primary focal point (nodes) of city planning. Subsequently, all nearby streets will be developed, and street furniture will serve as the main decorative element. The design of this street furniture should encourage residents and visitors to collaborate on social activities and maintain safety (security) for the benefit of both parties and communities, without excluding any group of people. Urban design will enhance the accessibility of street furniture and other amenities such as toilets, prayer rooms, or nearby public transport. Universal design is recommended, and this movement helps plan urban streets to attract a diverse population and promote active social behaviour. (Sustainable) streets and social interactions will add value to environmental and social aspects, increasing economic vitality and community civility. Finally, improving the physical condition (design character) will indirectly transform it into a multi-functional street capable of offering economic opportunities, allowing commercial and retail development.

6.11 Study Limitation

This research drew on surveys, interviews, and participatory workshops, enabling a diverse range of international respondents. Engaging with UK design companies during the interviews offered valuable insights into their operational methods.

However, some limitations arose, mainly a low survey response rate and challenges in securing detailed feedback from interviewees. Despite reaching out to over 30 companies, only a few responded, and many preferred face-to-face meetings, which were logistically difficult for the researcher to organise.

Time constraints presented another significant challenge. While some experts were willing to engage via email, their responses did not always provide the depth of information required. Open-ended questions often resulted in incomplete answers, and follow-up questions were necessary to clarify responses, which was only sometimes

feasible due to the remote nature of the interviews. Additionally, ethical considerations limited the scope of the research. Ethical review processes aimed to safeguard participants, especially minors who might appear mature in photographs.

As a result, the research was limited in using photographs of street seating users, which affected the ability to provide visual evidence in reporting user demographics and the types of people engaging with street furniture. Consequently, some findings could not be fully verified due to the lack of photographic evidence.

6.12 Future Research Recommendation

This thesis advances current knowledge by identifying five essential design factors that shape socially sustainable street seating in urban public spaces. These factors provide not only a structured analytical framework but also a practical guideline that can inform decision-making among designers and local authorities. Therefore, it is recommended that further research be undertaken in the following areas:

6.12.1.1 Cross-Cultural and Comparative Studies

Future research may expand this work by conducting broader cross-cultural comparisons, particularly between Global South and Global North urban contexts. While this study intentionally involved Malaysian participants familiar with both Malaysia and the UK to capture dual-context insights, further comparative studies involving diverse cultural groups would deepen understanding of how socio-cultural norms, climate, and behavioural expectations shape seating preferences, perceptions of comfort, safety, and accessibility.

6.12.1.2 Behavioural Analytics Using Emerging Technologies

Advancements in spatial technologies such as AI-based crowd analytics, sensor-driven behaviour mapping, and real-time environmental monitoring offer valuable tools for future research. Applying these methods can reveal micro-behaviours and subtle patterns of street seating use that complement traditional observations

and surveys, generating richer behavioural datasets and enhancing academic understanding of social interactions in public spaces.

6.12.1.3 Integrating the TBL Framework into Policy and Evaluation

Given the gaps identified in the social pillar of the Triple Bottom Line (TBL), future research could explore how local authorities, planning agencies, and design bodies can embed TBL's social dimension more systematically in policy-making, design standards, and public space audits. Such investigations would advance theoretical discourse on social sustainability and strengthen policy alignment between environmental, economic, and social considerations.

6.12.1.4 Real-World Prototyping and Post-Occupancy Evaluation

Although this study provides detailed design specifications and a comprehensive framework, future studies could undertake real-world prototyping of seating designs derived from the five factors. Post-occupancy evaluations, iterative design testing, and user feedback loops would generate empirical evidence that refines the framework and strengthens its applicability in professional practice.

6.12.1.5 Application in Different Urban Typologies

Future research may examine how the five design factors function across varied urban typologies beyond the retail-focused areas explored in this study. These may include university campuses, urban parks, waterfronts, transit hubs, heritage districts, suburban town centres, and privately owned public spaces (POPS). Such inquiry would broaden academic understanding of how spatial context, land use, and user demographics influence the design and performance of street seating.

6.12.1.6 Deepening Social Inclusion Within Specific User Groups

Building on this study's emphasis on social sustainability, future work could investigate how seating design impacts specific user groups such as older adults, women, people with disabilities, children, and migrant communities. This

research direction would contribute to evidence-based inclusive design frameworks and support policy development aimed at creating equitable, socially responsive public spaces.

“First life, then spaces, then buildings: the other way around never works” –

Jan Gehl

REFERENCES

- Abas, A., Arifin, K., Ali, M. A. M., & Khairil, M. (2023). A systematic literature review on public participation in decision-making for local authority planning: A decade of progress and challenges. In *Environmental Development* (Vol. 46). Elsevier B.V. <https://doi.org/10.1016/j.envdev.2023.100853>
- Abdul Rahman, N., Ghani, I., Bahaluddin, A., & Hussain, N. H. (2018). Creating Good Social Behavior through User-friendly Street Environment. *Asian Journal of Quality of Life*, 3(12), 51. <https://doi.org/10.21834/ajqol.v3i12.141>
- Abed, A. R. (2017). Assessment of social sustainability: a comparative analysis. *Proceedings of the Institution of Civil Engineers - Urban Design and Planning*, 170(2), 72–82. <https://doi.org/10.1680/jurdp.16.00020>
- Afacan, Y., & Gurel, M. O. (2015). Public toilets: An exploratory study on the demands, needs, and expectations in turkey. *Environment and Planning B: Planning and Design*, 42(2), 242–262. <https://doi.org/10.1068/b130020p>
- Alhaddi, H. (2015a). Triple Bottom Line and Sustainability: A Literature Review. *Business and Management Studies*, 1(2), 6. <https://doi.org/10.11114/bms.v1i2.752>
- Alhaddi, H. (2015b). Triple Bottom Line and Sustainability: A Literature Review. *Business and Management Studies*, 1(2), 6. <https://doi.org/10.11114/bms.v1i2.752>
- Allahdadi, M. (2017a). *Effectiveness of Urban Furniture Designing to Enhance Social Interactions*. <https://www.researchgate.net/publication/347933748>
- Allahdadi, M. (2017b). *Effectiveness of Urban Furniture Designing to Enhance Social Interactions*. <https://www.researchgate.net/publication/347933748>
- Allahdadi, M. (2017c). *Effectiveness of Urban Furniture Designing to Enhance Social Interactions*. <https://www.researchgate.net/publication/347933748>
- Allameh, E., & Heidari, M. (2020). Sustainable Street Furniture. *Periodica Polytechnica Architecture*, 51(1), 65–74. <https://doi.org/10.3311/ppar.12674>
- Alonzi, V. (2022, December 7). *New Challenges in Public Space*. Bouygues Construction. <https://www.bouygues-construction.com/blog/en/espaces-publics/>
- Alpak, E. M., Düzenli, T., & Mumcu, S. (2020). Raising awareness of seating furniture design in landscape architecture education: physical, activity-use and meaning dimensions. *International Journal of Technology and Design Education*, 30(3), 587–611. <https://doi.org/10.1007/s10798-019-09514-8>
- Altman, D., Burton, N., Cuthill, I., Festing, M., Hossein Askari, A., Binti Dola, K., Whalen, K. E., Paez, A., Bhat, C., Moniruzzaman, M., Paleti, R., Bunnell, T., Nah, A., Said, I., O'Hara, B. E., Ratnasingham, J., Ioras, F., Lee, K., Nam, K., ... Kishawy, H. A. (2012). Lively Streets. *Procedia - Social and Behavioral Sciences*, 6(2), 260–267. <https://doi.org/10.1177/0739456X07307947>
- Altrichter, H., Posch, P., & Somekh, B. (1996). Teachers Investigate Their Work : An introduction to the methods of action research. In *Teachers Investigate Their Work*. <https://doi.org/10.4324/9781315811918>
- Amir, S., Azizan, A., Zahari, R. K., & Asmawi, M. Z. (2020). URBAN PUBLIC SPACE AS SOCIAL INTERACTION SPACE: CASE STUDY IN PETALING STREET. *Journal of Tourism, Hospitality and Environment Management*, 5(19), 90–101. <https://doi.org/10.35631/jthem.519007>

- Anastasiu, B. (2021, July 21). *The pivotal role of public spaces in successful urban design*. Chapman Taylor. <https://www.chapmantaylor.com/insights/the-pivotal-role-of-public-spaces-in-successful-urban-design>
- Anderson, J., Ruggeri, K., Steemers, K., & Huppert, F. (2017). Lively Social Space, Well-Being Activity, and Urban Design: Findings From a Low-Cost Community-Led Public Space Intervention. *Environment and Behavior*, 49(6), 685–716. <https://doi.org/10.1177/0013916516659108>
- Andersson, C. (2016). Public Space and the New Urban Agenda. *The Journal of Public Space*, 1(1), 5. <https://doi.org/10.5204/jps.v1i1.4>
- Andrzejewski, A., & Salwa, M. (2020). What is an Urban Atmosphere? In *Contemporary Aesthetics (Journal Archive)* (Vol. 0, Issue 2).
- Arefpour, S., Miri, G. R., & Anvari, M. R. (2022). An investigation into vandalism and its effects on urban beauty. *International Journal of Human Capital in Urban Management*, 7(3), 405–416. <https://doi.org/10.22034/IJHCUM.2022.03.09>
- Arisoy, N. (2020). Measuring students' preferences for urban furniture vandalism in Selçuk University Campus in Turkey: A case study. *Archives of Agriculture and Environmental Science*, 5(3), 426–430. <https://doi.org/10.26832/24566632.2020.0503026>
- Asep Ahadiat Gandawijaya, R., Kirana, D. C., & Morika, D. (2021a). Study of public seating facilities with behavior and activity approaches on pedestrian street Ir. H. Djuanda Bandung. *IOP Conference Series: Earth and Environmental Science*, 794(1). <https://doi.org/10.1088/1755-1315/794/1/012078>
- Asep Ahadiat Gandawijaya, R., Kirana, D. C., & Morika, D. (2021b). Study of public seating facilities with behavior and activity approaches on pedestrian street Ir. H. Djuanda Bandung. *IOP Conference Series: Earth and Environmental Science*, 794(1), 012078. <https://doi.org/10.1088/1755-1315/794/1/012078>
- Asep Ahadiat Gandawijaya, R., Kirana, D. C., & Morika, D. (2021c). Study of public seating facilities with behavior and activity approaches on pedestrian street Ir. H. Djuanda Bandung. *IOP Conference Series: Earth and Environmental Science*, 794(1), 012078. <https://doi.org/10.1088/1755-1315/794/1/012078>
- Askarizad, R., & Safari, H. (2020). The influence of social interactions on the behavioral patterns of the people in urban spaces (case study: The pedestrian zone of Rasht Municipality Square, Iran). *Cities*, 101. <https://doi.org/10.1016/j.cities.2020.102687>
- Assunção, B. de, & Camara, J. J. D. (2000). Eco- Design and Materials Selection for Street Furniture; A Necessarily Ergonomic Approach in Urban Design. *Proceedings of the IEA 2000/HFES 2000 Congress*, 60–63.
- Aziz, A. (2013). *Sustainability of Street Furniture Design in Urban Malaysia*. University Putra Malaysia.
- Babafemi, A. J., Šavija, B., Paul, S. C., & Anggraini, V. (2018). Engineering Properties of Concrete with Waste Recycled Plastic: A Review. *Sustainability*, 10(11), 3875. <https://doi.org/10.3390/su10113875>
- Bailey Street Furniture Group. (2022, December 12). *Street Furniture - Seating*. Bailey StreetScene. <https://www.baileystreetscene.co.uk/street-furniture/seating>
- Baker, T. (2011). Seating and sitting in the V&A: An observational study. *V&A Online Journal*, 3, Spring. <http://www.vam.ac.uk/content/journals/research-journal/issue-03/seating-and-sitting-in-the-v-and-a-an-observational-study/>

- Bambó Naya, R., de la Cal Nicolás, P., Díez Medina, C., Ezquerra, I., García-Pérez, S., & Monclús, J. (2023). Quality of public space and sustainable development goals: analysis of nine urban projects in Spanish cities. *Frontiers of Architectural Research*, 12(3), 477–495.
<https://doi.org/10.1016/j.foar.2023.01.002>
- Banach-Ziaja, M. (2008). The furnishing of the urban public spaces in Poland Selected Issues. *Urban Challenge Journal*, 19(2), 192–198.
<https://www.ceeol.com/search/article-detail?id=210167>
- Baxter, P., & Jack, S. (2015). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report*.
<https://doi.org/10.46743/2160-3715/2008.1573>
- Ben Dhaou, O. (2023). *Designing Street Furniture: Principles and Criterias to Provide Adequate Approaches to Enhance the Quality of Life in Urban Spaces*.
- Ben Dhaou, O., & Vasvary-Nador, N. (2022). Integration of sustainable street furniture in Tunisian urban public spaces. *Pollack Periodica*, 17(1), 151–155.
<https://doi.org/10.1556/606.2021.00299>
- Ben Dhaou, O., Vasváry-Nádor, N., & Gall, A. (2022). Designing street furniture: A protocol to enhance the quality of life in urban spaces. *Pollack Periodica*, 17(2), 175–179. <https://doi.org/10.1556/606.2022.00506>
- Ben Dhaou, O., Vasváry-Nádor, N., Gall, A., & Gall, A. (2022). Designing street furniture: A protocol to enhance the quality of life in urban spaces. *Pollack Periodica*, 17(2), 175–179. <https://doi.org/10.1556/606.2022.00506>
- Bevan, T. A., Sklenar, O., Mckenzie, J. A., & Derry, W. E. (2007). *SUSTAINABLE URBAN STREET DESIGN AND ASSESSMENT AUTHORS*.
- Bhamra, T., Lilley, D., & Tang, T. (2011). Design for Sustainable Behaviour: Using products to change consumer behaviour. *Design Journal*, 14(4), 427–445.
<https://doi.org/10.2752/175630611X13091688930453>
- Bhamra, T., & Lofthouse, V. (2007). *Design for Sustainability*. Ashgate Publishing Limited.
- Black, P., Sonbli, T. E., & Philips, R. (2017). Character study - Toolkit. *Manchester Urban Design Lab*, 105(3), 57. <https://doi.org/10.4324/9780080473727-57>
- Body-Gendrot, S. (2013). *A Stroll through Public Space. About: Thierry Paquot, L'Espace public, La Découverte*.
- Borowski, A. (2014). Social Interactions in the Public Space in the Context of Public Confidence. *International Letters of Social and Humanistic Sciences*, 25, 33–41.
<https://doi.org/10.18052/www.scipress.com/ilshs.25.33>
- Bortoli, F. (2018). *The place of the privately owned public space in the contemporary city*. www.thesis.anparq.org.br
- Breslin, M., & Buchanan, R. (2008). On the Case Study Method of Research and Teaching in Design. *Design Issues*, 24(1), 36–40.
<https://doi.org/10.1162/desi.2008.24.1.36>
- Brown, J. (2018). Bollards, Safety and Urban Regeneration. *TMP Solutions*.
<https://tmp.solutions/bollards-safety-and-urban-regeneration/>
- Bryman, A. (2008). *Social research methods*. Oxford Univeresity Press.
- Bulut, Y., & Atabeyoğlu, Ö. (2007). Fountains as urban furniture in historical urban structure and usage culture: Erzurum city case. *Building and Environment*, 42(6), 2432–2438. <https://doi.org/10.1016/j.buildenv.2006.08.022>
- Cabanek, A., Zingoni de Baro, M. E., & Newman, P. (2020). Biophilic streets: a design framework for creating multiple urban benefits. *Sustainable Earth*, 3(1).
<https://doi.org/10.1186/s42055-020-00027-0>

- Cao, J., & Kang, J. (2019). Social relationships and patterns of use in urban public spaces in China and the United Kingdom. *Cities*, 93, 188–196. <https://doi.org/10.1016/j.cities.2019.05.003>
- Carmona, M. (2010). Contemporary public space: Critique and classification, part one: Critique. *Journal of Urban Design*, 15(1), 123–148. <https://doi.org/10.1080/13574800903435651>
- Carmona, M. (2014). *Exploration in Urban Design - An Urban Design Research Primer*.
- Carmona, M. (2019a). Place value: place quality and its impact on health, social, economic and environmental outcomes. *Journal of Urban Design*, 24(1), 1–48. <https://doi.org/10.1080/13574809.2018.1472523>
- Carmona, M. (2019b). Principles for public space design, planning to do better. *Urban Design International*, 24(1), 47–59. <https://doi.org/10.1057/s41289-018-0070-3>
- Carmona, M. (2021). *Public Places Urban Spaces; The Dimensions of Urban Design* (Third). Routledge, Taylor & Francis Group. <https://matthew-carmona.com>.
- Carmona, M., & De Magalhaes, C. (2006). Public Space Management: Present and Potential. *Journal of Environmental Planning and Management*, 49(1), 75–99. <https://doi.org/10.1080/09640560500373162>
- Carmona, M., De Magalhaes, C., & Edwards, M. (2002). Stakeholder views on value and urban design. *Journal of Urban Design*, 7(2), 145–169. <https://doi.org/10.1080/1357480022000012212>
- Carmona, M., Magalhães, C. de, & Hammond, L. (2008). *Public Space: The Management Dimension*.
- Caroline, O. S., Kartono, B., Sofiana, Y., & Indahyani, T. (2019). Functional Aspect of Seating furniture at Taman Fatahillah, Jakarta. *Humaniora*, 10(1), 1. <https://doi.org/10.21512/humaniora.v10i1.5200>
- Carson, R. (1962). *Silent spring*. Penguin.
- Carter, D. (2013). Urban Regeneration, Digital Development Strategies and the Knowledge Economy: Manchester Case Study. *Journal of the Knowledge Economy*, 4(2), 169–189. <https://doi.org/10.1007/s13132-012-0086-7>
- Cavalcante, A., Mansouri, A., Kacha, L., Barros, A. K., Takeuchi, Y., Matsumoto, N., & Ohnishi, N. (2014). Measuring streetscape complexity based on the statistics of local contrast and spatial frequency. *PLoS ONE*, 9(2). <https://doi.org/10.1371/journal.pone.0087097>
- Chen, Y., Liu, T., & Liu, W. (2016). Increasing the use of large-scale public open spaces: A case study of the North Central Axis Square in Shenzhen, China. *Habitat International*, 53, 66–77. <https://doi.org/10.1016/j.habitatint.2015.10.027>
- Chew, L., Hespanhol, L., & Loke, L. (2021). To Play and To Be Played: Exploring the Design of Urban Machines for Playful Placemaking. In *Frontiers in Computer Science* (Vol. 3). Frontiers Media S.A. <https://doi.org/10.3389/fcomp.2021.635949>
- Chiang, W. C., Mital, A., & Desai, A. (2009). A generic methodology based on Six-Sigma techniques for designing and manufacturing consumer products for functionality. *International Journal of Product Development*, 7(3/4), 349. <https://doi.org/10.1504/IJPD.2009.023327>
- Chitrakar, R. M., Baker, D. C., & Guaralda, M. (2017). Emerging Challenges in The Management of Contemporary Public Spaces in Urban Neighbourhoods. In

- International Journal of Architectural Research Rajjan Man Chitrakar, Doulas C Baker, Mirko Guaralda Archnet-IJAR* (Vol. 11).
- Colantonio, A. (2007). Social sustainability: An exploratory analysis of its definition, assessment methods metrics and tools. *EIBURS Working Paper Series, July 2007*, 1–37. <http://www.eprints.lse.ac.uk/35947>
- Colantonio, A. (2008). Traditional and Emerging Prospects in Social Sustainability. *Oxford Institute for Sustainable Development EIBURS Working Paper Series, November 2008*, 1–27.
- Comrey, A. L. (1992). *A First Course in Factor Analysis* (2nd ed.).
- Cornwall, A., & Gaventa, J. (2000). From users and choosers to makers and shapers: Repositioning participation in social policy. *IDS Bulletin*, 31(4), 50–62. <https://doi.org/10.1111/j.1759-5436.2000.mp31004006.x>
- Corsini, L., & Moultrie, J. (2021). What is design for social sustainability? A systematic literature review for designers of product-service systems. In *Sustainability (Switzerland)* (Vol. 13, Issue 11). MDPI AG. <https://doi.org/10.3390/su13115963>
- Creswell, J. W. (2013). *Qualitative Inquiry and Research Design - Choosing Among Five Approaches* (3rd ed.). SAGE Publication.
- Creswell, J. W., & David Creswell, J. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed., Vol. 5th). SAGE Publication.
- Crowe, S., Cresswell, K., Robertson, A., Hubby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology*, 11(1), 100. <https://doi.org/10.1186/1471-2288-11-100>
- Daramola-Martin, A. (2009). Liverpool One and the transformation of a city: Place branding, marketing and the catalytic effects of regeneration and culture on repositioning Liverpool. *Place Branding and Public Diplomacy*, 5(4), 301–311. <https://doi.org/10.1057/pb.2009.19>
- Dastgheib, S. (2018a). *Light and Perception of Safety - The role of lighting in perception of safety from a female perspective in in-between spaces of residential areas*. KTH Royal Institute of Technology.
- Dastgheib, S. (2018b). *Light and Perception of Safety in- between buildings: The role of lighting in perception of safety from a female perspective in-between spaces of residential areas*. KTH Royal Institute of Technology.
- David, L. (2009). *Liverpool One: Remaking a City Centre*.
- David, M., & Richards, W. (2017). *Evaluating Inclusive Design within a Zoological Street Furniture Framework*.
- de Magalhães, C., & Carmona, M. (2009). Dimensions and models of contemporary public space management in England. *Journal of Environmental Planning and Management*, 52(1), 111–129. <https://doi.org/10.1080/09640560802504704>
- Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, 19(5), 289–300. <https://doi.org/10.1002/sd.417>
- Design Council UK. (2011). *Designing out crime - A designers' guide Contents*.
- Diamnti, V. (2014). Street Furniture: Material choices for the modern urban environment. *Netmag Media*, 1. buildingconstructiondesign.co.uk
- Dines, N., Cattell, V., Gesler, W., & Curtis, S. (2006). *Public spaces, social relations and well-being in East London*.

- Dmochowski, A. A. (2016). *EXAMINING THE IMPACTS OF A NEW REGIONAL INNER-CITY RETAIL DEVELOPMENT ON LIVERPOOL'S EXISTING INNER-CITY SHOPPING CENTRES AND OTHER RETAIL AREAS*. Document, U. (1988). *The Brundtland Report: "Our Common Future"* (Vol. 4, Issue 1). <https://doi.org/10.1080/07488008808408783>
- Dolega, L., & Lord, A. L. (2020). Exploring the geography of retail decline: A case study of the Liverpool City Region. *Cities*, 96. <https://doi.org/10.1016/j.cities.2019.102456>
- Duzenli, T., Mumcu, S., & Merve ALPAK, E. (2018). Urban Streets from the Perspective of the Youth. *The Eurasia Proceedings of Educational & Social Sciences (EPESS)*, 11, 184–191. www.isres.org
- Ebneyamini, S., & Sadeghi Moghadam, M. R. (2018). Toward Developing a Framework for Conducting Case Study Research. *International Journal of Qualitative Methods*, 17(1), 160940691881795. <https://doi.org/10.1177/1609406918817954>
- Ehrenfeld, J. R. (2008). *Sustainability by Design*. New Haven Conn. :Yale Univ.Press.
- Eizenberg, E., & Jabareen, Y. (2017a). Social Sustainability: A New Conceptual Framework. *Sustainability*, 9(1), 68. <https://doi.org/10.3390/su9010068>
- Eizenberg, E., & Jabareen, Y. (2017b). Social Sustainability: A New Conceptual Framework. *Sustainability*, 9(1), 68. <https://doi.org/10.3390/su9010068>
- El-Kholei, A. O., & Yassein, G. (2022). Professionals' perceptions for designing vibrant public spaces: Theory and praxis. *Ain Shams Engineering Journal*, 13(5). <https://doi.org/10.1016/j.asej.2022.101727>
- Elkington, J. (1999). *Cannibals with Forks : The Triple Bottom Line of 21st Century Business*. Capstone Publishing Limited, Oxford United Kingdom.
- Elkington, J. (2001). Enter the Triple Bottom Line. *The Triple Bottom Line: Does It All Add Up?*, 1(1986), 1–16. <https://doi.org/10.1021/nl034968f>
- Ely, V. H. M. B., De Oliveira, J. M. H., & Logsdon, L. (2012). A bus stop shelter evaluated from the user's perspective. *Work*, 41(SUPPL.1), 1226–1233. <https://doi.org/10.3233/WOR-2012-0307-1226>
- Erfaneh, A., & Heidari, M. (2018). *Design for sustainability in education*. 848–854. <https://doi.org/10.3311/cc2018-110>
- Firdevs, G. (2013). Street Furniture and Amenities: Designing the User-Oriented Urban Landscape. In *Advances in Landscape Architecture*. InTech. <https://doi.org/10.5772/55770>
- First Sustainable Development Goals (SDGs) Summit 2017*. (2017).
- Fleming, R. (2013). *Design Education for a Sustainable Future*. Routledge, Abingdon Oxon, UK.
- Francis, J., Giles-Corti, B., Wood, L., & Knuiman, M. (2012). Creating sense of community: The role of public space. *Journal of Environmental Psychology*, 32(4), 401–409. <https://doi.org/10.1016/j.jenvp.2012.07.002>
- Franinovic, K. (n.d.). *Televator: Re-using phone booth as a responsive space and service*. Retrieved September 29, 2023, from https://www.researchgate.net/publication/266074078_TELEVATOR_RE-USING_PHONE_BOOTH_AS_A_RESPONSIVE_SPACE_AND_SERVICE
- Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational research : An introduction* (6th ed.). Longman.
- Gandy, M. (2017). Urban atmospheres. *Cultural Geographies*, 24(3), 353–374. <https://doi.org/10.1177/1474474017712995>

- Gao, F., & Cui, S. (2022). *Product Design with the Triple Bottom Line* (pp. 51–64). https://doi.org/10.1007/978-3-031-08871-1_4
- Gehl, J. (1987). Life Between Buildings: Using Public Space. In *Landscape Journal* (Vol. 8, Issue 1). <https://doi.org/10.3368/lj.8.1.54>
- Gehl, J. (1989). A Changing Street Life in a Changing Society. *Places Journal*, 26(1), 217–220. <https://doi.org/10.5811/westjem.2011.5.6700>
- Gehl, J. (2006). Public Spaces for a Changing Public Life. *Open Space: People Space*, 1–6. <https://doi.org/10.4324/9780203961827>
- Gehl, J. (2010). *Cities for People*. Island Press.
- Gehl Studio, P. W. (2018). *Downtown Parks and Public Realm Plan: Public Space Public Life Study*.
- Gomes, P. S. (2011). *Factors of Good Public Space Use*.
- Goodwine, K. (2019). *The Ethics of Single-Use Plastics* [DePauw University]. <https://scholarship.depauw.edu/studentresearch/105>
- Gopalakrishnan, K., Yusuf, Y. Y., Musa, A., Abubakar, T., & Ambursa, H. M. (2012). Sustainable supply chain management: A case study of British Aerospace (BAe) Systems. *International Journal of Production Economics*, 140(1), 193–203. <https://doi.org/10.1016/j.ijpe.2012.01.003>
- Gouvea, L., & Mont’Alvao, C. (2013). Observing the Urban Space: A Protocol to Analyse Street Furniture in Public Squares. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 555–559. <https://doi.org/10.1177/1541931213571119>
- Government, D. for C. and L. (2015). *Pocket parks: support for small areas of inviting public space where people can enjoy relief from the hustle and bustle of city streets*.
- Grabiec, A. M., Lacka, A., & Wiza, W. (2022a). Material, Functional, and Aesthetic Solutions for Urban Furniture in Public Spaces. *Sustainability (Switzerland)*, 14(23). <https://doi.org/10.3390/su142316211>
- Grabiec, A. M., Lacka, A., & Wiza, W. (2022b). Material, Functional, and Aesthetic Solutions for Urban Furniture in Public Spaces. *Sustainability (Switzerland)*, 14(23). <https://doi.org/10.3390/su142316211>
- Grabiec, A. M., Lacka, A., & Wiza, W. (2022c). Material, Functional, and Aesthetic Solutions for Urban Furniture in Public Spaces. *Sustainability*, 14(23), 16211. <https://doi.org/10.3390/su142316211>
- Greater Manchester Combined Authority. (2019). *Greater Manchester Spatial Framework Heritage Topic Paper Revision A*.
- Gustafsson, J. (2017). Single case studies vs. multiple case studies: A comparative study. *Academy of Business, Engineering and Science Halmstad University, Sweden*, 1–15. <http://www.diva-portal.org/smash/record.jsf?pid=diva2:1064378%0Ahttp://www.diva-portal.org/smash/get/diva2:1064378/FULLTEXT01.pdf>
- Hammer, J., & Pivo, G. (2017). The Triple Bottom Line and Sustainable Economic Development Theory and Practice. *Economic Development Quarterly*, 31(1), 25–36. <https://doi.org/10.1177/0891242416674808>
- Han, S., Song, D., Xu, L., Ye, Y., Yan, S., Shi, F., Zhang, Y., Liu, X., & Du, H. (2022). Behaviour in public open spaces: A systematic review of studies with quantitative research methods. In *Building and Environment* (Vol. 223). Elsevier Ltd. <https://doi.org/10.1016/j.buildenv.2022.109444>
- Hanafi, I., Araby, M. EL, Al-hagla, K. S., & Sayary, S. EL. (2013). *Spaces and Flows: An International Journal of Urban and ExtraUrban Studies Human*

- Social Behavior in Public Urban Spaces Towards Higher Quality Cities.*
www.commongroundpublishing.com
- Harding, A., Harloe, M., & Rees, J. (2010). Manchester's Bust Regime? *International Journal of Urban and Regional Research*, 34(4), 981–991.
<https://doi.org/10.1111/j.1468-2427.2010.01013.x>
- Hardscape.co.uk. (2022, December 12). *Street Furniture - Street Smart.*
<https://hardscape.co.uk/inspire/furniture/>
- Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836–850.
<https://doi.org/10.1016/j.cptl.2015.08.001>
- Harsritanto, B. I. (2018). Sustainable Streetscape Design Guideline based on Universal Design Principles. *MATEC Web of Conferences*, 159.
<https://doi.org/10.1051/mateconf/201815901003>
- Holland, C., Clark, A., Katz, J., & Peace, S. (2007). Social interactions in urban public places. *The Open University*, 12(1), 1–84. <https://doi.org/10.1186/1745-6215-12-264>
- Hossein Askari, A., & Soltani, S. (2022). The Role of Physical and Visual Elements in Creating Streetscapes: Cases in Kuala Lumpur City, Malaysia. *International Journal on Sustainable Tropical Design Research and Practice*, 15(2).
- İhtiyar¹, T. N., Firdevs, G., & Caymaz², Y. (2021). Evaluations of Urban Seating Design Criteria in Case of Zorlu Center and Margi Outlet Malls. *CAP - Public Art Journal*, 3(1), 72–93.
- Ismail, W. A. W., & Said, I. (2015). Integrating the Community in Urban Design and Planning of Public Spaces: A Review in Malaysian Cities. *Procedia - Social and Behavioral Sciences*, 168, 357–364.
<https://doi.org/10.1016/j.sbspro.2014.10.241>
- Israsena, P., Tangsantikul, J., Durling, D., Conference, B. I., Atkinson, P., Behirsch, J., Ramirez, M., Giurco, D., Behrisch, J., Manzini, E., Developments, P., Developments, C., Developments, G., Hekkert, P., Karjalainen, T., Margolin, V., Margolin, S., & Ward Thompson, C. (2013). Design aesthetics : principles of pleasure in design Design aesthetics : principles of pleasure in design. *Strategy*, 34(4), 157–172. <https://doi.org/10.1162/074793602320827406>
- Ivanov, J. (2009). *Drinking Fountains: The Past and Future of Free Public Water in the United States.*
- Jabbar, M., Yusoff, M. M., & Shafie, A. (2022). Assessing the role of urban green spaces for human well-being: a systematic review. In *GeoJournal* (Vol. 87, Issue 5, pp. 4405–4423). Springer Science and Business Media Deutschland GmbH. <https://doi.org/10.1007/s10708-021-10474-7>
- Jacobs, J. (1961). The Death and Life of Great American Cities. In *Vintage Book* (12th ed.).
- Janssen, C., Daamen, T. A., & Verdaas, C. (2021). Planning for urban social sustainability: Towards a human-centred operational approach. *Sustainability (Switzerland)*, 13(16). <https://doi.org/10.3390/su13169083>
- Jelsma, J., & Knot, M. (2002). Designing environmentally efficient services; a 'script' approach. *The Journal of Sustainable Product Design*, 2(3), 119–130.
<https://doi.org/10.1023/B:JSPD.0000031031.20974.1b>
- Kammersgaard, T. (2021). Private security guards policing public space: using soft power in place of legal authority. *Policing and Society*, 31(2), 117–130.
<https://doi.org/10.1080/10439463.2019.1688811>

- Kang, N., Ren, Y., Feinberg, F., & Papalambros, P. (2019). *Form + Function: Optimizing Aesthetic Product Design via Adaptive, Geometrized Preference Elicitation*. <http://arxiv.org/abs/1912.05047>
- Kaya, H. S., Erdem Kaya, M., Serdar Yakut, S. E., Çiçek, M., & Güler Tozluoğlu, E. (2022). An interdisciplinary urban furniture design model. *A/Z ITU Journal of the Faculty of Architecture*, 19(3), 721–740. <https://doi.org/10.5505/itujfa.2022.92979>
- Kayden, J. S. (2000). *Privately Owned Public Space : The New York City Experience: Vol. Vol. 33, No. 3* (Vol. 3, No. 3). John Wiley & Sons.
- Keeble, B. R. (1988). The Brundtland Report: “Our Common Future.” In *MEDICINE AND WAR* (Vol. 4). <https://about.jstor.org/terms>
- Ken, W., & Katharine, K. (2007). *The social value of public spaces*. <https://www.jrf.org.uk/report/social-value-public-spaces>
- Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T., Garforth, J., & Kennedy, J. (2022). State of the UK Climate 2021. *International Journal of Climatology*, 42(S1), 1–80. <https://doi.org/10.1002/joc.7787>
- Khedr, N. K., Ismail, A. M., & El-Fayoumi, M. A. (2022). Evaluating Environmental Sustainability of Egyptian New Urban Communities Based on UN Neighborhood Planning Principles. *Arch. Eng*, 45(5), 601–611.
- Kiełek, K. (2022). The importance of safety and security in urban space. *Humanities & Social Sciences Reviews*, 10(6), 21–23. <https://doi.org/10.18510/hssr.2022.1063>
- Kivunja, C., & Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, 6(5), 26. <https://doi.org/10.5430/ijhe.v6n5p26>
- Kowalewski, M. (2022). Archives of Urban Voices: Telephone booth by Monika Szpener. *Sound Studies*, 8(2), 278–280. <https://doi.org/10.1080/20551940.2022.2051797>
- Kries, M. (2006). *Designcity: Design for urban space and the design city discussion*.
- Kuswantoro, H., Sholihin, M., & Djajadikerta, H. G. (2023). Exploring the implementation of sustainable development goals: a comparison between private and state-owned enterprises in Indonesia. *Environment, Development and Sustainability*, 25(10), 10799–10819. <https://doi.org/10.1007/s10668-022-02505-1>
- Langstraat, F., & van Melik, R. (2013). Challenging the “End of Public Space”: A Comparative Analysis of Publicness in British and Dutch Urban Spaces. *Journal of Urban Design*, 18(3), 429–448. <https://doi.org/10.1080/13574809.2013.800451>
- Larimian, T., & Sadeghi, A. (2021). Measuring urban social sustainability: Scale development and validation. *Environment and Planning B: Urban Analytics and City Science*, 48(4), 621–637. <https://doi.org/10.1177/2399808319882950>
- Lee, J. H., & Lee, W. J. (2013). A Study on the impact of ubiquitous street furniture on human behavior - Based on media poles installed on Seoul’s Gangnam Boulevard. *Journal of Asian Architecture and Building Engineering*, 12(2), 181–188. <https://doi.org/10.3130/jaabe.12.181>
- Lee, J., & Lee, W. (2013). A Study on the Impact of Ubiquitous Street Furniture on Human Behavior-Based on Media Poles Installed on Seoul’ s Gangnam Boulevard. *Journal of Asian Architecture and Building Engineering*, September, 181–188. <https://doi.org/10.3130/jaabe.12.181>

- Lee, S. (2019). *Sustainable Design Approaches Using Waste Furniture Materials for Design Practitioners*.
- Lesan, M., & Gjerde, M. (2020). A mixed methods approach to understanding streetscape preferences in a multicultural setting. *Methodological Innovations*, 13(2). <https://doi.org/10.1177/2059799120937233>
- Lesovik, R., Degtev, Y., Shakarna, M., & Levchenko, A. (2014). Green Composites in Architecture and Building Material Science. *Modern Applied Science*, 9(1). <https://doi.org/10.5539/mas.v9n1p45>
- Li, J., Dang, A., & Song, Y. (2022). Defining the ideal public space: A perspective from the publicness. *Journal of Urban Management*, 11(4), 479–487. <https://doi.org/10.1016/j.jum.2022.08.005>
- Li, P.-Y., Chen, M.-S., Hibino, H., Koyama, S., & Zheng, M.-C. (2009). Rest Facilities at Commercial Plazas through User Behavior Perspective. *Journal of Asian Architecture and Building Engineering*, 8(1), 127–134. <https://doi.org/10.3130/jaabe.8.127>
- Lilley, D. (2007). *Designing for Behavioural Change: Reducing the Social Impacts of Products use through design*. Loughborough University.
- Lilley, D. (2009). Design for sustainable behaviour: strategies and perceptions. *Design Studies*, 30(6), 704–720. <https://doi.org/10.1016/j.destud.2009.05.001>
- Liverpool City Authority. (2017, May 23). *Visit Liverpool*. <https://www.visitliverpool.com/>
- Loviscek, V. (2021). Triple Bottom Line toward a Holistic Framework for Sustainability: A Systematic Review. In *Revista de Administracao Contemporanea* (Vol. 25, Issue 3 Special Issue). ANPAD - Associacao Nacional de Pos-Graduacao e Pesquisa em Administracao. <https://doi.org/10.1590/1982-7849rac2021200017.en>
- Low, S. M., & Smith, N. (2006). *The politics of public space*. Routledge.
- Luximon, Y., Kwong, H. Y., & Tai, Y. Y. (2015). User Preferences of Urban Park Seating Pattern in Hong Kong. *Procedia Manufacturing*, 3, 4273–4278. <https://doi.org/10.1016/j.promfg.2015.07.415>
- Lynch, K. (1960). The image of the city. In *Cambridge Mass. Technology Press*. The Technology Press & Harvard University Press, Cambridge.
- Machielse June, W., & Jansson, U. (2015). *Perceived safety in public spaces A quantitative investigation of the spatial and social influences on safety perception among young adults in Stockholm* [Stockholm University]. www.humangeo.su.se2
- Madanipour, A. (2006). Roles and challenges of urban design. *Journal of Urban Design*, 11(2), 173–193. <https://doi.org/10.1080/13574800600644035>
- Madanipour, A. (2010). *Whose Public Space?* (A. Madanipour, Ed.). Routledge. <https://doi.org/10.4324/9780203860946>
- Mamaghani, N. K., Asadollahi, A. P., & Mortezaei, S.-R. (2015). Designing for Improving Social Relationship with Interaction Design Approach. *Procedia - Social and Behavioral Sciences*, 201, 377–385. <https://doi.org/10.1016/j.sbspro.2015.08.190>
- Manchester City Council. (2012). *A Strategic Plan for Manchester City Centre 2009-2012*.
- Manchester City Council. (2018). *Manchester City Council*. <https://www.visitmanchester.com>
- Manifesty, O. R., Min, B., & Kim, S. (2022). Maximizing Public and Private Satisfaction for a Better Privately Owned Public Space: The Case of Yeouido

- Business District. *Urban Science*, 6(4), 84.
<https://doi.org/10.3390/urbansci6040084>
- Mann, S. (2011). A critical review of qualitative interviews in applied linguistics. *Applied Linguistics*, 32(1), 6–24. <https://doi.org/10.1093/applin/amq043>
- Manzini, E. (2012). Error-friendliness: How to deal with the future scarcest resource: The environmental, social, economic security. that is, how to design resilient socio-technical systems. *Architectural Design*, 82(4), 56–61.
<https://doi.org/10.1002/ad.1429>
- Margolin, V., & Margolin, S. (2002). A " Social Model " of Design: Issues of Practice and Research. *Design Issues*, 18(4).
- Marshall, D. C. (2022, May 9). *How can privately owned public space transform our cities?* Indesign Live Asia Newsletter. <https://www.indesignlive.sg/insight/how-privately-owned-public-space-transform-cities>
- Marshall, S. (2015). Refocusing urban design as an integrative art of place. *Proceedings of the Institution of Civil Engineers: Urban Design and Planning*, 168(1), 8–18. <https://doi.org/10.1680/udap.13.00040>
- Marshall.co.uk. (2022, December 12). *Street Furniture*.
<https://www.marshalls.co.uk/commercial/landscape-protection/street-furniture>
- Martin, B., & Hanington, B. (2019). *Universal Methods of Design* (Second). Rockport Publisher.
- Mauk Sewandono. (2022). *SUSTAINABLE STREET FURNITURE AND ITS EFFECT ON STREETSCAPE PERCEPTION*.
- McDonough, W. (2002). Design for the Triple Top Line: New Tools for Sustainable Commerce. *Corporate Environmental Strategy*, 9(3), 251–258.
[https://doi.org/10.1016/S1066-7938\(02\)00069-6](https://doi.org/10.1016/S1066-7938(02)00069-6)
- McKenzi, S. (2004). *Social Sustainability: Towards Some Definitions* (Issue 27).
http://www.global.rmit.edu.au/resources/historyofanidea_25.07.01.pdf
- Mehta, V. (2007). Lively Streets: Determining Environmental Characteristics to Support Social Behavior. *Journal of Planning Education and Research*, 27(2), 165–187. <https://doi.org/10.1177/0739456X07307947>
- Mehta, V. (2008). Walkable streets: pedestrian behavior, perceptions and attitudes. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 1(3), 217–245. <https://doi.org/10.1080/17549170802529480>
- Mehta, V. (2013). *The Street - A Quintessential Social Public Space* (1st ed). Routledge, Abingdon Oxon, UK.
<https://doi.org/https://doi.org/10.4324/9780203067635>
- Mehta, V. (2014). Evaluating Public Space. *Journal of Urban Design*, 19(1), 53–88.
<https://doi.org/10.1080/13574809.2013.854698>
- Mehta, V., & Bosson, J. K. (2021). Revisiting Lively Streets: Social Interactions in Public Space. *Journal of Planning Education and Research*, 41(2), 160–172.
<https://doi.org/10.1177/0739456X18781453>
- Meijerink-Bosman, M., Back, M., Geukes, K., Leenders, R., & Mulder, J. (2022). Discovering trends of social interaction behavior over time: An introduction to relational event modeling: Trends of social interaction. *Behavior Research Methods*. <https://doi.org/10.3758/s13428-022-01821-8>
- Mensch, J. (2007). Public Space. *Continental Philosophy Review*, 40, 31–47.
<https://doi.org/10.1007/s11007-006-9038-x>
- M.Hashim, A. (2011). *Does the ' Room E ffect' G eneralise to Designed Products? An I nvestigation of the ' Product E ffect.'* Swinburne Australia.

- Miller, G., Rathouse, K., Scarles, C., Holmes, K., & Tribe, J. (2010). Public understanding of sustainable tourism. *Annals of Tourism Research*, 37(3), 627–645. <https://doi.org/10.1016/j.annals.2009.12.002>
- Moberg, M. (2016). *Integrating Social Sustainability within the design of a building A case study of five projects at an architectural firm.*
- Mohapatra, B., & Mohamed, A. R. (2013). Place attachment and participation in management of neighbourhood green space: a place-based community management. *International Journal of Sustainable Society*, 5(3), 266. <https://doi.org/10.1504/IJSSOC.2013.054715>
- Mohd Fabian, H., Osman, M. T., & Mohd Nasir, B. (2012). SOCIAL SCIENCES & HUMANITIES Towards Integrating Public Art in Malaysian Urban Landscape. *Pertanika J. Soc. Sci. & Hum*, 20(2), 251–263.
- Moreira, F. D., Rezende, S., & Passos, F. (2021). On-street toilets for sanitation access in urban public spaces: A systematic review. *Utilities Policy*, 70. <https://doi.org/10.1016/j.jup.2021.101186>
- Morelli, J. (2011). Environmental Sustainability: A Definition for Environmental Professionals. *Journal of Environmental Sustainability*, 1(1), 1–10. <https://doi.org/10.14448/jes.01.0002>
- Mouthé, C. R., & de Menezes, J. B. (2000). *Ergonomics Methodology for Comparative Study of Street In Different Cities.*
- Mumcu, S., & Yilmaz, S. (2016). *Seating Furniture in Open Spaces and Their Contribution to the Social Life.* <https://www.researchgate.net/publication/309285059>
- Niedderer, K., Ludden, G., Clune, S., Lockton, D., Mackrill, J., Morris, A., & Cain, R. (2016). Design for Behaviour Change as a Driver for Sustainable Innovation : Challenges and Opportunities for Implementation in the Private and Public Sectors Design for Behaviour Change. *International Journal of Design*, 10(2), 67–85.
- Niedderer, K., Mackrill, J., Clune, S., Evans, M., Lockton, D., Ludden, G., Morris, A., Gutteridge, R., Gardiner, E., Cain, R., & Hekkert, P. (2014). *Joining Forces : Investigating the influence of design for behaviour change on sustainable innovation.* 620–630.
- Nogueira Lopes, M. N. (2015). *The Changing Publicness of Urban Spaces* [University of Porto]. <http://www.fe.up.pt>
- Norman, D. A. (2013). The Design of Everyday Things. In *Human Factors and Ergonomics in Manufacturing* (Vol. 16, Issue 4). <https://doi.org/10.1002/hfm.20127>
- NYC Privately Owned Public Space History - DCP. (2023). <https://www.nyc.gov/site/planning/plans/pops/pops-history.page>
- Openshaw, S., & Taylor, E. (2006). Ergonomics and Design A Reference Guide. *Allsteel Design to Work Build to Last*, 1–2. www.allsteeloffi%5Cnce.com/ergo
- Oram, T., Baguley, A. J., & Swain, J. (2018a). Effects of outdoor seating spaces on sociability in public retail environments. *The Journal of Public Space*, Vol. 3 n. 3 | 2018 | FULL ISSUE, 75–102. <https://doi.org/10.32891/jps.v3i3.668>
- Oram, T., Baguley, A. J., & Swain, J. (2018b). Effects of outdoor seating spaces on sociability in public retail environments. *The Journal of Public Space*, 3(Vol. 3 n. 3 | 2018 | FULL ISSUE), 75–102. <https://doi.org/10.32891/jps.v3i3.668>
- Pacheco, P. (2017, June 9). *Public Spaces: 10 Principles for Connecting People and the Streets.* The City Fix - World Resource Institute.

- <https://thecityfix.com/blog/public-spaces-10-principles-for-connecting-people-and-the-streets-priscila-pacheco/>
- Peyman, G., & Gökçen Firdevs, Y. C. (2014). Evaluation of Street Furniture According To Basic Design Principles. *International Journal of Electronics Mechanical and Mechatronics Engineering*, 4(3), 757–772.
- Phillips, D. (2004). *Daylighting - Natural Light in Architecture*.
- Ponto, J. (2015). Understanding and Evaluating Survey Research. *Journal of the Advanced Practitioner in Oncology*, 6(2), 168–171.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4601897/pdf/jadp-06-168.pdf>
- Prvanov, S. (2017). *Street Furniture in High-Density Urban Areas: Geometry, Ergonomic and CNC Production* [The American University of Kurdistan].
<https://doi.org/10.13140/RG.2.2.20396.26242/1>
- Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, 14, 681–695.
<https://doi.org/10.1007/s11625-018-0627-5>
- Radwan, A. H., Abdel, A., & Morsy, G. (2016). The Importance of Integrating Street Furniture In The Visual Image Of The City. In *www.ijmer.com* | (Vol. 9, Issue 2). <https://ssrn.com/abstract=3264621>
- Raipat, V. (2016). *Cities People Places' 30* (Vol. 1).
- Rebecca L. H. Chiu. (2003). Social sustainability, sustainable development and housing development: the experience of Hong Kong. In *Housing and Social Change* (1st ed., p. 19). Routledge.
- Rehan, R. M. (2013a). Sustainable streetscape as an effective tool in sustainable urban design. *HBRC Journal*, 9(2), 173–186.
<https://doi.org/10.1016/j.hbrj.2013.03.001>
- Rehan, R. M. (2013b). Sustainable streetscape as an effective tool in sustainable urban design. *HBRC Journal*, 9(2), 173–186.
<https://doi.org/10.1016/j.hbrj.2013.03.001>
- Robson, C., & McCartan, K. (2016). *Real World Research* (4th ed.).
- Salim Ferwati, M., Keyvanfar, A., Shafaghat, A., & Ferwati, O. (2021). A Quality Assessment Directory for Evaluating Multi-functional Public Spaces. *Architecture and Urban Planning*, 17(1), 136–151. <https://doi.org/10.2478/aup-2021-0013>
- Samavati, S., Desmet, P. M. A., & Ranjbar, E. (2024). Happy urban public spaces: a systematic review of the key factors affecting citizen happiness in public environments. In *Cities and Health*. Routledge.
<https://doi.org/10.1080/23748834.2024.2358600>
- Sanches, M. G., & Frankel, L. (2010). Co-design in Public Spaces : an Interdisciplinary Approach to Street Furniture Development. *Drs2010 Unmontreal*.
- Sanches, M. G., Frankel, L. ; D., Bousbaci, R., Chen, L., Gauthier, P., & Poldma, T. (2010). *Co-design in Public Spaces: an Interdisciplinary Approach to Street Furniture Development*.
- Sarkar, P., Rachuri, S., Suh, H. W., Lyons, K., & Sriram, R. D. (2009). A Measure of Product Sustainability Based on Triple Bottom Line. *Volume 8: 14th Design for Manufacturing and the Life Cycle Conference; 6th Symposium on International Design and Design Education; 21st International Conference on Design Theory and Methodology, Parts A and B*, 267–274. <https://doi.org/10.1115/DETC2009-87047>

- Schulte-Römer, N., Meier, J., Söding, M., & Dannemann, E. (2019). The LED Paradox: How light pollution challenges experts to reconsider sustainable lighting. *Sustainability (Switzerland)*, 11(21).
<https://doi.org/10.3390/su11216160>
- Science, P. (2006). Design aesthetics : principles of pleasure in design Design aesthetics : principles of pleasure in design. *Psychology Science*, 48(2), 157–172.
http://www.academia.edu/download/35736738/Hekkert__P._Design_aesthetics_principles_of_pleasure_in_design.pdf
- Scinta, S. B. (2017). *Type and Location of Seating on Pedestrian Streets and Influence on Duration of Stay*.
- Sesini, G., Castiglioni, C., & Lozza, E. (2020). New Trends and Patterns in Sustainable Consumption: A Systematic Review and Research Agenda. *Sustainability*, 12(15), 5935. <https://doi.org/10.3390/su12155935>
- Siddique, R., Khatib, J., & Kaur, I. (2008). Use of recycled plastic in concrete: A review. *Waste Management*, 28(10), 1835–1852.
<https://doi.org/10.1016/j.wasman.2007.09.011>
- Siláči, I., & Vitková, L. (2017a). Public Spaces as the Reflection of Society and its Culture. *IOP Conference Series: Materials Science and Engineering*, 245(4).
<https://doi.org/10.1088/1757-899X/245/4/042009>
- Siláči, I., & Vitková, L. (2017b). Public Spaces as the Reflection of Society and its Culture. *IOP Conference Series: Materials Science and Engineering*, 245(4).
<https://doi.org/10.1088/1757-899X/245/4/042009>
- Silverman, D. (2004). *Qualitative research: Issues of theory, method and practice*.
- Siu, K. W. M. (2005). Pleasurable products: public space furniture with user fitness. *Journal of Engineering Design*, 16(6), 545–555.
<https://doi.org/10.1080/09544820500273383>
- Siu, K. W. M., & Hong Wan, P. (2011). Roles of Street Furniture in a Constructed Environment. *The International Journal of The Constructed Environment*, 1(3).
- Siu, K. W. M., & Wong, K. S. L. (2015). Flexible Design Principles: Street furniture design for transforming environments, diverse users, changing needs and dynamic interactions. *Facilities*, 33(9/10), 588–621. <https://doi.org/10.1108/f-02-2014-0021>
- Slaper, T. F., & Hall, T. J. (2011). *The Triple Bottom Line: What Is It and How Does It Work*. 86(1).
- Smith, A. (2015). *Events in the City*. Routledge.
<https://doi.org/10.4324/9781315765129>
- Soffritti, C., Calzolari, L., Chicca, M., Neri, R. B., Neri, A., Bazzocchi, L., & Garagnani, G. L. (2020). Cast iron street furniture: A historical review. *Endeavour*, 44(3). <https://doi.org/10.1016/j.endeavour.2020.100721>
- Sofiana, Y. (2018). Exploring Street Furniture Problems for Public Space in Ragunan Zoo. *BINUS Joint International Conference*.
<https://doi.org/10.5220/0010023500002917>
- Sokhibi, A., Alfarisi, S., & Ajeng Alifiana, M. (2020). Ergonomics Analysis Of Public Seat In The Kudus Town Square. *Journal of Physics: Conference Series*, 1430(1), 012001. <https://doi.org/10.1088/1742-6596/1430/1/012001>
- Sridhar, K. (2011). A multi-dimensional criticism of the Triple Bottom Line reporting approach. *International Journal of Business Governance and Ethics*, 6(1), 49. <https://doi.org/10.1504/IJBGE.2011.037606>

- Stace, S. (2011). *Creating Places for People - Developing an Australian Urban Design Protocol*.
- Stephen Carr, Carr Stephen, Mark Francis, Leanne G. Rivlin, A. M. S. (1992). *Public Space* (S. Carr, Ed.; illustrate). Cambridge University Press.
- Stephen Carr, Carr Stephen, Mark Francis, Leanne G. Rivlin, A. M. S. (1992). *Public Space* (S. Carr, Ed.). Cambridge University Press.
- Street Furniture Australia. (2019, September 19). *How to Apply DDA to Street Furniture: Seats and Tables*. <https://Streetfurniture.Com/How-to-Apply-Dda-to-Street-Furniture-Seats-and-Tables/>. <https://streetfurniture.com/how-to-apply-dda-to-street-furniture-seats-and-tables/>
- Sun, P., Liu, P., & Song, Y. (2024). Seasonal variations in urban park characteristics and visitation patterns in Atlanta: A big data study using smartphone user mobility. *Urban Forestry and Urban Greening*, 91. <https://doi.org/10.1016/j.ufug.2023.128166>
- Susan, D., Lenore, M., & Veronica, L. T. (1993). *A manual for the use of groups*.
- Tazilan, A. (2012). Identifying microarchitecture for sustainable design in Malaysia. *Smart and Sustainable Built Environment*, 1(2), 172–185. <https://doi.org/10.1108/20466091211260659>
- Tazilan, A. S. M., Salleh, H., Ibrahim, K., & Ismail, A. H. (2012). Sustainable Design Elements for Urban Street Microarchitecture in Malaysia. *Alam Cipta*, 35–44.
- Tazilan, A., & Salleh, H. (2008). Sustainable design elements for urban street microarchitecture in Malaysia. *ALAM CIPTA International Journal*, 3(1), 35–44. <http://frsb.upm.edu.my/alamcipta/index.php/alamcipta/article/download/38/24>
- Thamrin, D., Mulyono, G., & Antoni. (2018). Usability Evaluation of Adaptable Urban Park Furniture Product with Cellular Light-weight Concrete as Material. *IOP Conference Series: Materials Science and Engineering*, 408, 012033. <https://doi.org/10.1088/1757-899X/408/1/012033>
- The Sustainable Development Goals Report*. (2021).
- Tibbalds, F. (2012). *Making People-Friendly Towns* (F. Tibbalds, Ed.). Taylor & Francis. <https://doi.org/10.4324/9780203469521>
- Toop, R. (2020, December 11). *Liverpool One: “Shopping centres provide a stage for people to explore their identity.”* <https://www.thedeveloper.live/places/places/liverpool-one-shopping-centres-provide-a-stage-for-people-to-explore-their-identity>
- Tseng, M.-L., Chang, C.-H., Lin, C.-W. R., Wu, K.-J., Chen, Q., Xia, L., & Xue, B. (2020). Future trends and guidance for the triple bottom line and sustainability: a data driven bibliometric analysis. *Environmental Science and Pollution Research*, 27(27), 33543–33567. <https://doi.org/10.1007/s11356-020-09284-0>
- Turner, P., & Turner, S. (2010). Triangulation in Presence Research. *Triangulation In Practice*, 1–13. p.turner@napier.ac.uk, s.turner@napier.ac.uk
- UN-Habitat. (2018a). *PUBLIC SPACE*.
- UN-Habitat. (2018b). *PUBLIC SPACE*.
- Uzgör, O., Firdevs, G., & Caymaz, Y. (2021). Urban Outdoor Seating Elements, An Assessment for the Post-Pandemic Era. *SAUC*, 7(2), 48–65.
- Wall, E. (2022, November 21). *The importance of ensuring inclusive and accessible public spaces*. Open Access News. <https://www.openaccessgovernment.org/inclusive-and-accessible-public-spaces-accessibility/147800/>

- Wannarka, R., & Ruhl, K. (2008). Seating arrangements that promote positive academic and behavioural outcomes: A review of empirical research. *Support for Learning*, 23(2), 89–93. <https://doi.org/10.1111/j.1467-9604.2008.00375.x>
- Ward Thompson, C. (2002). Urban Open Space in the 21st Century. *Landscape and Urban Planning*, 60, 59–72. [https://doi.org/10.1016/S0169-2046\(02\)00059-2](https://doi.org/10.1016/S0169-2046(02)00059-2)
- Weder, F. (2023). The Evolution of the Sustainability Story: Strategic Sustainability Communication as Niche Construction. *International Journal of Strategic Communication*, 17(3), 228–244. <https://doi.org/10.1080/1553118X.2023.2229304>
- Wever, R., van Kuijk, J., & Boks, C. (2008). User-centred design for sustainable behaviour. *International Journal of Sustainable Engineering*, 1(1), 9–20. <https://doi.org/10.1080/19397030802166205>
- Whyte, W. H. (1980). *The Social Life of Small Urban Spaces*. Project for Public Spaces.
- Whyte, W. H. (1988). *Rediscovering the Center*. University of Pennsylvania Press. <http://www.jstor.org/stable/j.ctt3fh8fz>
- Williams, G. (1996). Manchester. *Cities*, 13(3), 203–212. [https://doi.org/10.1016/0264-2751\(96\)00008-X](https://doi.org/10.1016/0264-2751(96)00008-X)
- Williams, G. (2000). Rebuilding the Entrepreneurial City: The Master Planning Response to the Bombing of Manchester City Centre. *Environment and Planning B: Planning and Design*, 27(4), 485–505. <https://doi.org/10.1068/b2626>
- Wirdelöv, J. (2020). The trash bin on stage: On the sociomaterial roles of street furniture. *Urban Planning*, 5(4), 121–131. <https://doi.org/10.17645/up.v5i4.3310>
- Wirdelöv, J. (2022). *Behavioural Atmospheres and Vagueness in the Sharing of Urban Public Places*.
- Woodcraft, S., Hackett, T., & Caistor-Arendar, L. (2012). Design for Social Sustainability New Communities. *Social Life*, 54. http://www.futurecommunities.net/files/images/Design_for_Social_Sustainability_0.pdf
- World Commission on Environment. (1987). *Report of the World Commission on Environment and Development: Our Common Future*.
- Yang, Z., Zhang, L., & Wu, Z. (2022). *Research on Performance Evaluation of Urban Furniture Function Design based on Internet of Things Digitization; Research on Performance Evaluation of Urban Furniture Function Design based on Internet of Things Digitization. 1*. <https://doi.org/10.1109/ACCESS.2017.Doi>
- Yavuz, A., & Kuloğlu, N. (2011). The effects of locational factors on vandalism in the seaside parks. *Scientific Research and Essays*, 6(20), 4207–4212. <https://doi.org/10.5897/sre11.012>
- Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd ed.). Thousand Oaks, Calif. ; London : Sage Publications.
- Yücel, G. F. (2013). Street Furniture and Amenities : Designing the User-Oriented Urban Landscape. *Advances in Landscape Architecture*, 623–644. <https://doi.org/10.5772/55770>
- Zamanifard, H. (2018). *Urban Public Space Governance and Its Implications for Qualities of Place* [Thesis]. Griffith University.
- Zebracki, M. (2013). Beyond public artopia: Public art as perceived by its publics. *GeoJournal*, 78(2), 303–317. <https://doi.org/10.1007/s10708-011-9440-8>

- Zeisel, J. (1984). *Inquiry by Design: Tools for Environment - Behaviour Research*. Cambridge [Cambridgeshire] ; New York, NY, USA : Cambridge University Press, 1984. <https://search.library.wisc.edu/catalog/999553259602121>
- Zhang, Y., Chen, G., He, Y., Jiang, X., & Xue, C. (2022a). Social Interaction in Public Spaces and Well-Being among Elderly Women: Towards Age-Friendly Urban Environments. *International Journal of Environmental Research and Public Health*, 19(2). <https://doi.org/10.3390/ijerph19020746>
- Zhang, Y., Chen, G., He, Y., Jiang, X., & Xue, C. (2022b). Social Interaction in Public Spaces and Well-Being among Elderly Women: Towards Age-Friendly Urban Environments. *International Journal of Environmental Research and Public Health*, 19(2). <https://doi.org/10.3390/ijerph19020746>
- Zhou, S. L. (2019). *Greenest City Scholar Project Understanding “Inclusiveness” in Public Space: Learning from Existing Approaches*.
- Zvonareva, P. P., Filipskaya, I. V., & Yangulova, I. V. (2020a). A new approach to the design of street furniture in Krasnoyarsk. *IOP Conference Series: Materials Science and Engineering*, 944(1). <https://doi.org/10.1088/1757-899X/944/1/012009>
- Zvonareva, P. P., Filipskaya, I. V., & Yangulova, I. V. (2020b). A new approach to the design of street furniture in Krasnoyarsk. *IOP Conference Series: Materials Science and Engineering*, 944(1). <https://doi.org/10.1088/1757-899X/944/1/012009>

APPENDICES



Fwd: [External] REAMS (Applicant Info) Ethics Approval from Faculty Research Ethics Committee FASSLUMS-2024-4209-RECR-2

From: donotreply@infonetica.net <donotreply@infonetica.net>

Sent: Tuesday, February 6, 2024 7:25:28 PM

To: Aziz, Arnis (Postgraduate Researcher) <a.aziz4@lancaster.ac.uk>

Cc: Boyko, Christopher <c.boyko@lancaster.ac.uk>

Subject: [External] REAMS (Applicant Info) Ethics Approval from Faculty Research Ethics Committee FASSLUMS-2024-4209-RECR-2

This email originated outside the University. Check before clicking links or attachments.

Dear Arnis Aziz,

Please note that this is an automated e-mail (Please do not reply to this e-mail).

Name: Arnis Aziz

Supervisor: Christopher Boyko

Department: LICA

FASS LUMS REC Reference: FASSLUMS-2024-4209-RECR-2

Title: Active Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces

Thank you for submitting your ethics application in REAMS. The application was recommended for approval by the FASS LUMS Research Ethics Committee, and on behalf of the Committee, I can confirm that approval has been granted for this application.

As Principal Investigator/Co-Investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licences and approvals have been obtained.
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress).
- submitting any changes to your application, including in your participant facing materials (see attached amendment guidance).

Please keep a copy of this email for your records. Please contact me if you have any queries or require further information.

If you are experiencing any problems please contact your Research Ethics Officer.

Yours sincerely,

Dr Karolina Follis / Dr Gary Potter
Chair and Deputy Chair FASS/LUMS Research Ethics Committee
fass.lumsethics@lancaster.ac.uk



Letter.pdf

Amendment Guidance for Research Ethics Application Management System (REAMS).

If you have an approved ethics application and would like to make changes to your protocol or your research group, you need to file an amendment. An **amendment application supersedes the earlier version** which will become void, only the latest amendment is valid.

There are two different kinds of amendments: **Minor Amendments** and **Substantial Amendments** and the procedure varies depending on if your ethics approval was processed in REAMS or before the system was launched. **Please read and follow this guide.**

1. Minor amendments

The amendments listed below can be considered as minor without the need for ethical review. However, **all minor amendments** to your ethics application **must be submitted** to the relevant **University's Faculty Research Ethics Committee** in order for them to have a record of the most recent version of your application for audit purposes.

The following changes are considered to be 'minor amendments':

1. A change of project title only: with the caveat that the project remains the same and only the title is amended.
 1. A change to the project end date up to *two* years (maximum) after the original *end* date.
 2. Extending the team with additional member(s) and changes to individual members, e.g., replacing one post doc with another will not require ethical review if the protocol has not changed. However, a change of **principal investigator/supervisor** will require a substantial amendment to be submitted. Special care needs to be taken if a student is added. If a student is added to the application in a supporting role a substantial amendment needs to be filed and if the student is becoming the new PI for a project this will require a full new application via REAMS.
- d) Change in emergency contact phone number for the PI and or applicant
1. Change in department but not in Faculty
 1. Inclusion of new *research* sites with the caveat that:
 - nothing else will change, e.g., the same protocol will be followed and already approved documents will be used **and**
 - new sites are similar to existing sites.

If different kinds of sites will be used, (e.g., adding schools to university sites), this will require a substantial amendment to be submitted.
2. Any combination of the above changes.

There are two different routes to submit a minor amendment to an already approved ethics application:

1.1 Minor amendments to projects that were originally approved in REAMS:

- Open your **approved application** in REAMS, then click "+ Create Sub Form" and choose "Minor Amendment Form." Start your amendment by clicking "Click here to begin your amendment" and then follow through the form, signing it at the end.
- The new information that you add in this special minor amendment form will be incorporated into your application and will be visible if you ask for further amendments or if you print your form as pdf. If you need to make another minor amendment, click the line "Research Ethics Application Form" of your application to mark it grey, then use "+ Create Sub Form" again and follow the same procedure as above.
- Multiple Amendments can be filed and should be named consecutively (MA-1, MA-2, SA-3, MA-4, SA-5, etc. for minor (MA-1, MA-2, MA-3) and substantial (SA-3, SA-5) amendments, respectively).

1.2 Minor amendments to projects that were approved prior to the launch of REAMS:

- These are not processed in REAMS. You should **highlight** the minor change on the version of your ethics application which was previously approved (word or pdf file).
- Submit it attached to an E-mail to your Faculty Research Ethics Officer stating that you are sending a minor amendment.
- In your E-mail confirm which minor amendment(s) (a-f above) apply and state that there are no other changes than those listed in a-f above.
- Your Research Ethics Officer will save the updated application and record the minor change(s) for their Committee(s) records and reports.

2. Substantial Amendments

Substantial Amendments are amendments other than those listed above (under ‘Minor Amendments’ items a-g). **All Substantial Amendment must be submitted in REAMS and reviewed and approved** by one of the Faculty Research Ethics Committees before the amendment is implemented.

2.1 Substantial Amendmentsto ethics applications which were originally approved in REAMS:

Open your **approved application** in REAMS, click “+ create Sub Form” and choose “Substantial Amendment Form.” You can then work through your most recent REAMS form for the application and make all the changes you need. The system will ask for your amendment number and as mentioned above please add the numbers consecutively irrespective of it being a substantial or minor amendment (e.g., SA-1, SA-2, MA-3, SA-4 etc). If you are introducing changes in your supporting documents, please delete the old file and upload the new files. Once you submit your amendment it will be reviewed and approved by the Chair of your Faculty’s Ethics Committee.

2.2 Substantial Amendments to projects which were originally approved before REAMS was launched:

1. Take your previously approved version of your application. That is either your first application, or your latest amendment that you filed before REAMS started.
2. Amend all the documents in which you need to make changes and **highlight** all changes and additions in yellow and delete old parts by “strike through”, so that it is possible to see what was there previously.
3. Find the E-mail with your approval letter, or any other E-mail indicating the Application ID number (e.g., FST19127, FHMREC20007, FL18597).
4. When you have this information, access REAMS, “create project” and begin your new application. Follow through the questions of the form.
5. When you reach the question: “Is this an amendment to a project previously approved pre-REAMS by Lancaster University,” tick “Yes.” Then answer the next set of questions.
6. When you reach the question: “Which system was the previous application approved on?” select “I confirm this is an amendment to a paper-based application.” You will then need to provide the previous application ID number and answer questions regarding your amendment.
7. Thereafter, the program will direct you on how to upload the files of your amended application. Please upload **all** files that are part of your application, that means those files where you did changes (amended) as well as those files that were kept unchanged. This is necessary as your application has not previously been added into REAMS. When uploading the file in the respective fields, please indicate in the field version number if the file has been amended (write: “amended”) or if the file is still identical to your old application (write: “original”).
8. Accept all declarations and sign the form, it will then be automatically sent to the Research Ethics Officer, or if applicable to your supervisor.



Street Furniture Survey

Hello, I'm a PhD student at Lancaster University, currently studying street furniture design. I need to know how street furniture design can enhance people's behaviour. By 'street furniture', I mean things in the road and on the pavement, like benches, kiosks, lighting, rubbish bins, bicycle racks, phone booth, etc. Thus, your experience and opinions are valuable for this survey, and you must be aged 18 years and above. By filling this survey, you are giving your consent to use the data provided for this study.

1. Please indicate how often you come to this place?

- ☐ Every day
☐ At Least Once A Week
☐ A Few Times a Month
☐ Monthly or Less

2. How long do you usually spend here?

- ☐ LESS than one hour
☐ Between 1-2 hours
☐ Between 2-3 hours
☐ Almost THE WHOLE DAY

3. What do you do when you come here?

- ☐ Shopping
☐ Hanging out with Friends and/or Family
☐ Having Time to Myself
☐ Working
☐ Other; (Please Specify) _____

4. How satisfied are you with the place, specifically the environment?

- ☐ Very Unsatisfied
☐ Unsatisfied
☐ Neither Nor
☐ Satisfied
☐ Very Satisfied

5. How well do you think the street furniture design suits the surrounding?

- ☐ Very Poorly
☐ Poorly
☐ Neither Nor
☐ Well
☐ Very Well

6. How welcoming do you think the overall design of the street furniture environment is?

- ☐ Very Unwelcoming
☐ Unwelcoming
☐ Neither Nor
☐ Welcoming
☐ Very Welcoming

7. How likely are you to use the street furniture provided?

- ☐ Not Very Likely
☐ Not Likely
☐ Neither Nor
☐ Likely
☐ Very Likely

8. Which of this street furniture you commonly use in this area? (Select ALL that apply).

- ☐ Benches
☐ Bicycle Racks
☐ Seating with Table
☐ Telephone
☐ Other; (Please Specify) _____

Please explain your response here: _____

9. What is your favourite activity when using the street seating in this area?

- ☐ Meeting
(with Friends, Family,
Colleague, etc.)
☐ Eating/Drinking
☐ Lingerig /
Hanging outs
(with Friends, Family,
Colleague, etc.)
☐ Smoking
☐ Other; (Please Specify) _____

10. How likely are you to communicate with a stranger using the same seating in this area?

- ☐ Not Very Likely
☐ Not Likely
☐ Neither Nor
☐ Likely
☐ Very Likely

11. What would you like to see in the future with regards to street furniture design?

Please state below.

Thank you for taking the time to answer my survey.

Please rank the following images of street furniture in order of preference from 1 to 9, with 1 being your MOST preferred image and 9 being your LEAST preferred image.



Please explain your reason here;

Dear Sir or Madam,

Interview request for PhD data validation

Hello, I'm Arnis Aziz, a PhD candidate in Sustainable Design at Lancaster Institute for the Contemporary Arts (LICA), Lancaster University, UK. My research explores how street seating design impacts active social behaviour for social sustainability in urban public spaces. I've analysed various street furniture designs with a specific focus on street seating and the identification of five key thematic factors: 1. Sustainability 2. Accessibility 3. Nodes 4. Security, and 5. Design Character.

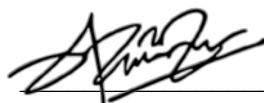
As a respected design company of _____, I value your expertise. I'm seeking validation and insights from professionals like yourself regarding experiences and knowledge of socially sustainable street seating design. Your input is invaluable in validating my findings and enriching the study.

I would appreciate it if you could spare your time validating my findings for my PhD. Interviews can take place on a date, time, and place of your convenience and should last about an hour. I would like to speak with you about street furniture design, sustainable design, and social sustainability. Your company/organisation name and your representative name will be anonymised in my study. If you have any questions, please do not hesitate to contact me via email at **a.aziz4@lancaster.ac.uk**

For any confirmation about my PhD student status and other relevant information, you may also contact my supervisors, Dr Christopher Boyko (c.boyko@lancaster.ac.uk) and Dr Emmanuel Tseklevs (e.tseklevs@lancaster.ac.uk), Lancaster Institute for the Contemporary Arts (LICA), Lancaster University, Lancaster, LA1 4YW, United Kingdom.

Thank you very much for considering my offer, and I look forward to your reply.

Yours Sincerely,



Arnis Aziz

Lancaster Institute of Contemporary Arts (LICA)
Lancaster University, Lancaster, LA1 4YW,
United Kingdom.

What are the possible disadvantages and risks of taking part?

It is unlikely that there will be any major disadvantages, and no risks are anticipated if you participate in this study. However, if you experience any distress during the study, we can stop the interview and any recording. I will ask if you want to continue or not. And if you do not want to continue, I will contact you a week later to see whether you want the data collected in the part-interview to be included in the study. If you do not, I will securely destroy the data.

Will my data be identifiable?

No. The information you provide is confidential and will be anonymised when it is disseminated. Only I and my supervisors will know your identity and have access to the data.

How will we use the information you have shared with us, and what will happen to the results of the research study?

The information you have shared will only be used for research purposes, and the results of the study will be published in my doctoral research thesis and journals and will be presented at academic seminars and conferences. A summary of the results will be made available to all participants. When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised quotes (e.g. from my interview with you), so that although I will use your exact words, you cannot be identified in my publications.

How my data will be stored?

During and after the study, all data will be my responsibility and will be stored securely on university premises. The digital recorder cannot be encrypted, but any identifiable data (including recordings of participants' voices) will be deleted from the recorder as quickly as possible (when it has been transferred to my university network account on a password-protected PC); in the meantime, the recorder will be stored securely. Hard copies of the transcriptions or notes, maps and diaries will be kept in a locked filing cabinet on university premises. Electronic data files will be encrypted and stored on a password-protected computer. All data will only be accessible to the researcher. All data relating to the study will be securely destroyed 10 years after the study has been completed.

What if I have a question or concern?

If you have any queries about the study, or if you are unhappy with anything that happens concerning your participation in the study, please feel free to contact myself at a.aziz4@lancaster.ac.uk **OR** my supervisors, Dr Christopher Boyko, c.boyko@lancaster.ac.uk and Dr Emmanuel Tseklevs, e.tseklevs@lancaster.ac.uk

AND, if you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact the Head of the Department, **Professor Alan Marsden**, Email: a.marsden@lancaster.ac.uk Office: **B140, B - Floor, County, Lancaster University.**

OR Postal Address and Contact No:

Lancaster Institute for the Contemporary Arts (LICA)
The LICA Building
Lancaster University
Lancaster
United Kingdom
LA1 4YW.
Contact No: **+44 (0)1524 524475**

AND, for further information about how Lancaster University processes personal data for research purposes and your data rights, please visit our webpage: www.lancaster.ac.uk/research/data-protection.

Thank You for considering your participation.

Participant Information Sheet **(Participatory Workshop)**

A study of the relationship between street furniture design and social interaction.

I am a PhD student at Lancaster University and I am exploring people's behaviour while using street furniture in two sets of pedestrian areas in the UK: **Manchester** (*Arndale, St. Anne's Square, Exchange Square and Selfridges*) & **Liverpool** (*Liverpool One, Church St., Williamson Square and Clayton Square*). **Please read and consider the following information before deciding whether you would like to participate in my study.**

What is the study about?

This study aims to explore how street furniture design may encourage positive behaviour and improve social interaction, with a focus on street seating. Thus, it is important for me to ask people who use street furniture in pedestrian areas in UK cities about their activities and their perspectives about street furniture design. My research also includes speaking with experts who work in the following: street furniture design, town planning and/or urban design.

Why have I been invited?

You have been identified as a possible participant in this study because you are a Malaysian national who has been studying, working or living in the UK for at least one year. You also have knowledge of both Malaysia and UK pedestrian areas in city centres and have used street furniture in the areas, you might know the area where you have been sitting and/or you have shown some interest in the subject. I would be glad to hear of your experiences and I would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

You will be asked to agree to be participate in the workshop, conducted by the researcher. The duration will be approximately one to two hours, and will be held on a date, time, and place to be confirmed later. The workshop will consist of three sets of activities: (1) Listening to, and discussing, the anonymised summary of my observations, survey and interview data; (2) Talking about your preferences for different street furniture configurations and; (3) Drawing, designing and planning mock-street furniture and street furniture configurations.

Before the workshop starts, you will be asked to read and sign a Consent Form. If you agree, the workshop will be audio recorded and then will be transcribed. All interviews will be anonymised in the transcript. Only me and my supervisors will know your identity. If you do not agree to be recorded, I will take notes during the interview, and will anonymise those notes.

What are the possible benefits from taking part?

There probably will not be a direct benefit to you as a result of the research but this will allow you to share your experiences. And if you take part in this study, your insights may be used to enhance street furniture design and will generate new possibilities for social interaction for the current and next generations.

Do I have to take part?

It is completely your choice whether to take part in this study. You are under no obligation to participate and your participation is voluntary. There are no incentives for agreeing to take part, and there are no benefits to taking part. You do not need to offer an explanation if you decide not to take part. And if you are a student, this will not affect your studies and the way you are assessed on your course.

What if I change my mind?

It is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Hence, it is impractical for workshop participants to withdraw their contribution once the group has started and recording begun. However, you are welcome to withdraw from the study at any time before the workshop begins. You can also opt not to contribute information/data at any point throughout the workshop.

What are the possible disadvantages and risks of taking part?

It is unlikely that there will be any major disadvantages and no risks is anticipated if you participate in this study.

Will my data be identifiable?

No. The information you provide is confidential and will be anonymised when it is disseminated. Only the researcher and supervisors will know the identity of the participant and have access to the data. The only other person who will have access to what you contributed is professional transcriber; who will listen to the recordings and produce a written record of what you have said, the transcriber will sign a confidentiality agreement. Participants will be asked not to disclose information outside the workshop room and with anyone not involved in the workshop without the relevant person's express permission.

How will we use the information you have shared with us and what will happen to the results of the research study?

The information you have shared will only be used for research purposes and the results of the study will be published in my doctoral research thesis and journals, and will be presented at academic seminars and conferences. A summary of the results will be made available to all participants. When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised quotes (e.g. from my interview with you), so that although I will use your exact words, you cannot be identified in my publications.

How my data will be stored?

During and after the study, all data will be my responsibility and will be stored securely on University premises. The digital recorder cannot be encrypted, but any identifiable data (including recordings of participants' voices) will be deleted from the recorder as quickly as possible (when it has been transferred to my university network account, on a password protected PC); in the meantime, the recorder will be stored securely. Hard copies of the transcriptions or notes, maps and diaries will be kept in a locked filing cabinet on University premises. Electronic data files will be encrypted and stored on password protected computer. All data will only be accessible to the researcher. All data relating to the study will be securely destroyed 10 years after the study has been completed.

What if I have a question or concern?

If you have any queries about the study, or if you are unhappy with anything that happens concerning your participation in the study please feel free to contact myself at **a.aziz4@lancaster.ac.uk**

OR my supervisors, Dr Christopher Boyko (c.boyko@lancaster.ac.uk) and Dr Emmanuel Tseklevs (e.tseklevs@lancaster.ac.uk).

AND, if at any stage of the study you wish to speak about a concern or complaint relating to this study, please contact our Head of Department (LICA), Judith Mottram by email: judith.mottram@lancaster.ac.uk; by phone: +44 (0)1524 594395; or by address: Lancaster Institute for the Contemporary Arts (LICA), LICA Building, Lancaster University, Bailrigg, Lancaster LA1 4YW United Kingdom.

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Thank You for considering your participation in this project.

Active Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces.

I am a PhD student at Lancaster University, and I am exploring people's behaviour while using street furniture in two sets of pedestrian areas in the UK: **Manchester** (*Arndale, St. Anne's Square, Exchange Square and Selfridges*) & **Liverpool** (*Liverpool One, Church St., Williamson Square and Clayton Square*). **Please read and consider the following information before deciding whether you want to participate in my study.**

What is the study about?

This study aims to explore how street furniture design may encourage positive behaviour and improve social interaction, focusing on street seating. Thus, it is essential for me to ask people who use street furniture in pedestrian areas in UK cities about their activities and their perspectives on street furniture design. My research also includes speaking with professionals who work in the following fields: street furniture design, town planning, and/or urban design.

Why have I been invited?

You have been identified as a possible participant in this study because your company or organisation specialises in street furniture design, town planning and/or urban design. Furthermore, you also have experience working on projects related to street furniture design, town planning and/or urban design. I would be glad to hear about your experiences, and I would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

You will be interviewed by me. This will involve me presenting findings from my PhD research and then asking you questions that may help me validate what I have found. The duration will be approximately an hour and will be held on a date, time, and place to be confirmed later. The validation will cover the following topics: Street furniture design, social sustainability, and urban public spaces.

After agreeing to participate in the interview, you will be asked to read and sign a Consent Form. If you agree, the "in-person interview will be audio recorded", while "video recording will be employed for online interviews (Google Meet)" and then transcribed. All interviews will be anonymised in the transcript. Only I and my supervisors will know your identity. If you do not agree to be recorded, I will take notes during the interview and anonymise those notes.

What are the possible benefits of taking part?

There may not be a direct benefit to you due to the research, but this will allow you to share your experiences. If you participate in this study, your insights may be used to enhance street furniture design, focusing on street seating design and will generate new possibilities for social interaction for the current and next generations.

Do I have to take part?

It is completely your choice whether to take part in this study. You are under no obligation to participate, and your participation is voluntary. You do not need to offer an explanation if you decide not to take part, and this will not affect your position in the company or your relations with your employer.

What if I change my mind?

You can refuse to answer any questions during the interview or stop it without offering any explanation. You can also withdraw from the study without offering an explanation up to three weeks after the first interview has been conducted. If you stop your interview and/or withdraw from the study, no data collected before stopping the interview or withdrawing from the study will be used without your permission.

Consent Form **(Participatory Workshop)**

A study of the relationship between street furniture design and social interaction.

***Please read carefully and put your initial in each box to demonstrate consent.**

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and I am free to withdraw from this study, without giving any reasons, and that my legal rights will not be affected. I am free to refuse to answer any question. ☐
3. I understand that once the workshop begins, I cannot withdraw my contributions and I need to continue and be present until the workshop end. ☐
4. I understand that if I withdraw up to three weeks after my interview has been conducted, any data collected will not be used without my consent. ☐
5. I understand that my interview will be recorded and transcribed by the researcher and only the researcher and the supervisors will know my identity. ☐
6. I understand that anonymised quotes from my interviews may be used in dissemination of the research, and that any personal data will remain confidential, and my details known only to the researcher and the supervisor. ☐
7. I understand that the transcription or interviews notes, will be kept in a locked filing cabinet on University premises. Any electronic files will be encrypted and stored on a password protected computer. No one other than the researcher and supervisors will be able to access data collected for this study. All data will be securely destroyed 10 years after the study has been completed. ☐
8. I agree to my interview being audio-recorded. ☐
9. I agree to participate in this study. ☐

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Participant	Participant's Signature	Date
ARNIS AZIZ		
Name of Researcher	Researcher's Signature	Date

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University

A study of the relationship between street furniture design and social interaction.

I am a PhD student at Lancaster University and I am exploring people's behaviour while using street furniture in two sets of pedestrian areas in the UK: **Manchester** (*Arndale, St. Anne's Square, Exchange Square and Selfridges*) & **Liverpool** (*Liverpool One, Church St., Williamson Square and Clayton Square*). **Please read and consider the following information before deciding whether you would like to participate in my study.**

What is the study about?

This study aims to explore how street furniture design may encourage positive behaviour and improve social interaction, with a focus on street seating. Thus, it is important for me to ask people who use street furniture in pedestrian areas in UK cities about their activities and their perspectives about street furniture design. My research also includes speaking with experts who work in the following: street furniture design, town planning and/or urban design.

Why have I been invited?

You have been invited and identified as a possible participant in this study because you are using street furniture in the area, you might know the area where you are sitting and/or you have shown some interest in the subject. I am glad to hear your experience and it would be grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

You will be asked to agree to participate in the survey conducted by the researcher. You will be given a set of questions to answer over two pages. The questions will cover street furniture design, social interactions and sustainability. All data provided will be anonymised and only I and my supervisors will have access to the data.

What are the possible benefits from taking part?

There probably will not be a direct benefit to you as a result of the research but this will allow you to share your experiences. And if you take part in this study, your insights may be used to enhance street furniture design and will generate new possibilities for social interaction for the current and next generations.

Do I have to take part?

It is completely your choice whether to take part in this study. You are under no obligation to participate and your participation is voluntary. There are no incentives for agreeing to take part, and there are no benefits to taking part. You do not need to offer an explanation if you decide not to take part.

What if I change my mind?

If you change your mind, you are free to withdraw at any time during answering the survey. And if you plan to withdraw, please let me know, and I will securely destroy the data. You will not have to explain your withdrawal. However, it is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Therefore, you are not allowed to withdraw your contribution once the data have been submitted. As this is anonymous questionnaires, withdrawal may not be possible, because the data is anonymised and the data provided it will not be possible to identify as yours.

What are the possible disadvantages and risks of taking part?

It is unlikely that there will be any major disadvantages and no risks is anticipated if you participate in this study.

Will my data be identifiable?

No. The information you provide is confidential and will be anonymised when it is disseminated. Only the researcher and supervisors will know the identity of the participant and have access to the data.

How will we use the information you have shared with us and what will happen to the results of the research study?

The information you have shared will only be used for research purposes and the results of the study will be published in my doctoral research thesis and journals, and will be presented at academic seminars and conferences. A summary of the results will be made available to all participants. When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised quotes (e.g. from my interview with you), so that although I will use your exact words, you cannot be identified in my publications.

How my data will be stored?

During and after the study, all data will be my responsibility and will be stored securely on University premises. The digital recorder cannot be encrypted, but any identifiable data (including recordings of participants' voices) will be deleted from the recorder as quickly as possible (when it has been transferred to my university network account, on a password protected PC); in the meantime, the recorder will be stored securely. Hard copies of the transcriptions or notes, maps and diaries will be kept in a locked filing cabinet on University premises. Electronic data files will be encrypted and stored on password protected computer. All data will only be accessible to the researcher. All data relating to the study will be securely destroyed 10 years after the study has been completed.

What if I have a question or concern?

If you have any queries about the study, or if you are unhappy with anything that happens concerning your participation in the study please feel free to contact myself at a.aziz4@lancaster.ac.uk

OR my supervisors, Dr Christopher Boyko (c.boyko@lancaster.ac.uk) and Dr Emmanuel Tseklevs (e.tseklevs@lancaster.ac.uk).

AND, if at any stage of the study you wish to speak about a concern or complaint relating to this study, please contact our Head of Department (LICA), Judith Mottram by email: judith.mottram@lancaster.ac.uk; by phone: +44 (0)1524 594395; address: Lancaster Institute for the Contemporary Arts (LICA), LICA Building, Lancaster University, Bailrigg, Lancaster LA1 4YW United Kingdom.

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Thank You for considering your participation in this project.

Section A: Professional Details

Date : _____

Organisation : _____

Name : _____

Working Designation : _____

Working Scope : _____

Years of Professional / Academic : _____

Experiences

Professional Field

- a. Industrial Designer ()
- b. Landscape Architect ()
- c. Architect ()
- d. Academician Researcher ()
- e. Planner ()
- f. Other (Specify) () _____

Section B: Research Validation Questions

A. In fostering active social behaviour within Urban Public Spaces through Street Seating design, what characteristics hold the utmost significance for professionals working in this domain? And please explain.

B. This study discovered **five key factors to improve street seating in urban spaces, encouraging active social behaviour**. Your feedback is crucial as it could influence future design guidelines for local authorities and designers.

i. Sustainability

In your professional opinion, how crucial is the consideration of sustainability factors (materials and practices) in the initial stages of planning and designing new street seating installations in urban public spaces?

What critical sustainable design principles should be prioritised for street seating to encourage social sustainability and interaction in urban areas?

Do you concur that sustainability is vital in the initial planning of new street seating designs to promote social interaction and enhance social sustainability?

ii. Nodes

How crucial is the strategic placement of street seating to create social nodes or hubs, fostering community interaction and active social behaviour in urban public spaces?

What criteria prompted you to consider the nodes factor as a critical element in the early stages of designing street seating for urban public spaces, aiming to promote active social behaviour and social sustainability?

From your professional experience, do you agree that the nodes are one of the most significant factors to consider?

iii. Security

Considering the design context, what balance should be achieved between security requirements and the design of welcoming, people-centric public seating areas within an urban environment?

Could you explain how far security features can be successfully integrated into street seating in urban public spaces to promote social interaction while ensuring safety?

What makes incorporating security measures crucial in planning a new street seating design to create inviting urban environments that promote active social behaviour and sustainability?

iv. Accessibility

How can integrating accessibility into street seating design enhance city inclusivity and usage, fostering an inviting setting for social interaction and sustainability?

What challenges might arise when integrating accessible features into street seating, and how do these considerations directly affect the promotion of active social behaviour in public spaces?

Could you share instances where prioritising accessibility in street seating design has directly contributed to encouraging active social behaviour and sustainability within urban spaces?

v. Design Character

How does adding distinct features to street seating help build a sense of identity and community in open spaces in cities, encouraging people to mingle and interact with each other?

From your expertise, could you outline specific design character elements that have proven to encourage social interaction and contribute to the overall social sustainability of urban areas through street seating?

How does emphasising visual attractiveness and design character in street seating impact social interaction in urban settings?

C. Please tick the answer.

As an expert in this domain....

- a. Do you find yourself in agreement with the factors that have been identified? ☐
- b. Are you certain that it comprises every essential component that ought to be prioritised by designers or specialists in the context of this research? ☐
- c. Do you suggest all the identified factors have universal applicability across different countries, considering variations in geography, climate conditions, and cultural differences? ☐

If you have further comments, please state below;

Your Cooperation Is Appreciated.

Lancaster Institute for the Contemporary Arts
Lancaster University



**Active Behaviour for Social Sustainability Through Street Seating Design
in Urban Public Spaces.**

Findings Validation

ARNIS BINTI AZIZ

PhD Student

LICA, Lancaster University

a.aziz4@lancaster.ac.uk

All the information and data given is confidential.

Consent Form

Active Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces.

****Please read carefully and put your initials in each box to demonstrate consent.***

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily. ☐
2. I agree that my participation is voluntary, that I am free to withdraw from this study without giving any reasons, and that my legal rights will not be affected. I am free to refuse to answer any question. ☐
3. I agree and understand that if I want to withdraw from the study, I can do so at any point up to three weeks after the interview has been conducted. ☐
4. I agree and understand that if I withdraw up to three weeks after my interview has been conducted, any data collected will not be used without my consent. ☐
5. I agree and understand that for in-person interviews, audio recording will be utilised. OR, in the case of online interviews conducted through Google Meet, video recording will be employed. ☐
6. I agree and understand the researcher will transcribe the interviews, and only the researcher and the supervisors will have access to the information, ensuring the confidentiality of my identity. ☐
7. I understand that anonymised quotes from my interviews may be used to disseminate the research, that any personal data will remain confidential, and that my details are known only to the researcher and the supervisor. ☐
8. I understand that the transcription or interview notes will be kept in a locked filing cabinet on university premises. Any electronic files will be encrypted and stored on a password-protected computer. No one other than the researcher and supervisors can access the data collected for this study. All data will be securely destroyed 10 years after the study has been completed. ☐
9. I understand that my name/organisation's name will not appear in any reports, articles, or presentations without my consent. ☐
10. I agree to participate in this study. ☐

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Participant

ARNIS AZIZ

Name of Researcher

Participant's Signature

Researcher's Signature

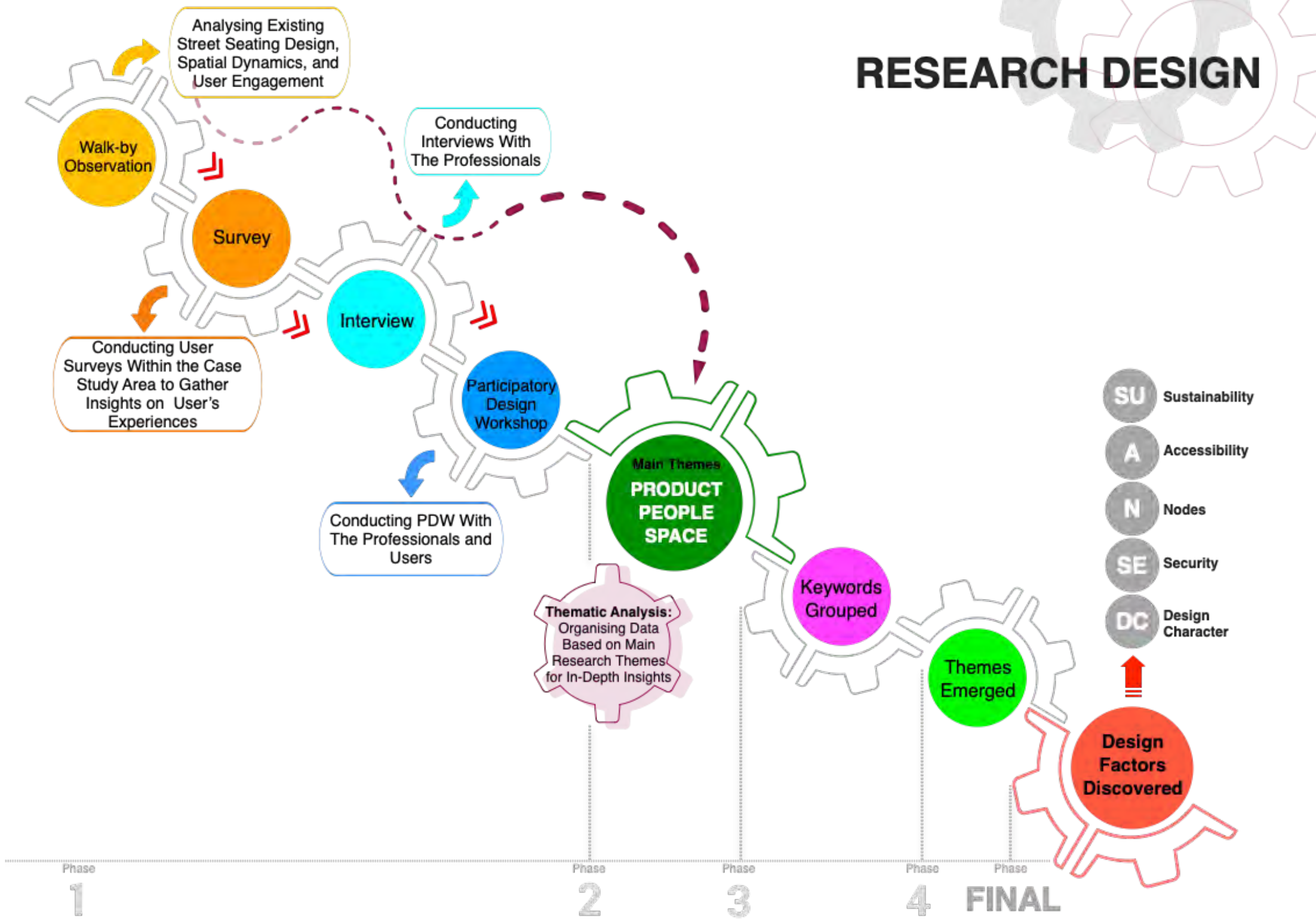
Date -----

Date 12 February 2024

Research Abstract

In the 21st century, cities strive to achieve vibrancy, safety, and sustainability by focusing on human activities in public spaces (Ersalan, 2016). Street furniture significantly impacts public life by enabling various activities such as social interaction, sitting, gathering, and standing (Gehl, 2010). Numerous studies have acknowledged the capacity of street furniture to enhance social sustainability and shape public perceptions of a city (Rehan, 2013; Sanches & Frankel, 2010, as cited in Yucel, 2013). The street seating design is crucial, and as Oram (2018) asserts, seating plays a significant role in enhancing the social functionality of public places by facilitating prolonged activities. However, insufficient planning and design frequently result in disregarding or improperly using street furniture, negatively affecting safety and functionality (Tazilan, 2012; Wai, Siu, Sing, Wong et al., 2015). Designers have been criticised for their narrow focus on functionality while overlooking important cultural, social, and psychological factors (Siu, 2005). This research aims to investigate the impact of street seating design on active social behaviour, with a specific focus on user behaviour, design aspects, and characteristics related to urban public spaces. By conducting comprehensive research and gaining a deep understanding of these parameters, designers can create street seating designs that are socially sustainable. These designs can seamlessly integrate into their surroundings and promote pleasant social interactions, potentially enhancing the overall well-being of urban residents. Upon completion of the study, a compilation of theories, observations, actions, keywords, themes, and prior hypotheses from an assortment of sources has been analysed and formulated into five major thematic factors. These factors pertain to encouraging active behaviour for social sustainability through the design of street seating in urban public spaces.

RESEARCH DESIGN



5 Critical Factors

for Active Social Behaviour for Social Sustainability Through Street Seating Design in Urban Public Spaces

Nodes

Value to the Product:

Enhancing urban connectivity and fostering community interaction.

Strategic Positioning:

Optimizing seating placement around nodes for social engagement.

User Significance:

Encouraging social interaction and serving as cultural/recreational hubs.

Place Identity Impact:

Establishing unique atmospheres and engaging community involvement.

Impacts for Planners & Designers:

Guiding design principles for inviting and engaging urban environments.

Community Involvement:

Stakeholder participation in community-driven street seating planning.

Sustainability

Value to the Product:

Prioritizing eco-friendly materials and practices for reduced environmental impact.

Durability and Longevity:

Emphasizing durable materials for extended lifespan and reduced replacements.

Significance to End Users:

Promoting healthier urban environments with eco-friendly designs.

User Comfort & Well-being:

Implementing sustainable materials for enhanced safety and comfort.

Consequences for Designers & Authorities:

Guiding sustainable principles for urban development and policies.

Policy & Regulation Impact:

Encouraging environmentally favourable materials through policies.

Accessibility

Importance & Value:

1. Emphasising inclusive design elements for a more comprehensive user spectrum.

Regulatory Standards:

1. Ensuring compliance with ADA regulations and promoting inclusivity.

End User Focus:

1. Equitable access for all, fostering community and belonging.

Impacts for Planners & Designers:

1. Guiding universal design principles for an inclusive approach.
2. Community Engagement:
3. Collaborating with diverse stakeholders for responsive design.

Design Character

Significance & Value:

Establishing urban identity and enhancing aesthetic appeal.

User Experience Enhancement:

Boosting user experience through visually appealing, functional designs.

Cultural Representation:

Integrating cultural themes into seating design for community connection.

Impacts for Planners & Designers:

Fostering innovation and community engagement in design.

Placemaking & Engagement:

Involving stakeholders for ownership and increased space utilisation.

Security

Product Enhancement:

1. Boost User Perception
2. Increase Utilization
3. Enhance Practicality and Value.

User Benefits:

1. Foster Comfort
2. Encourage Social Engagement
3. Promote Community Interaction

Increased Utilization:

1. Encourage Diverse & Frequent Usage
2. Accommodate Various Activities & Demographics
3. Elevate Overall Space Value

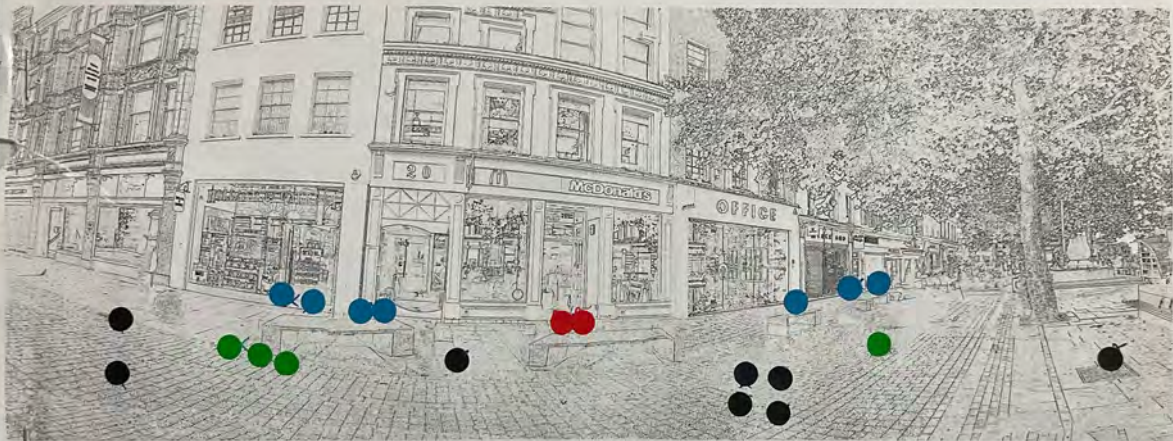
Impact on Designers & Planners:

1. Influence Design Priorities
2. Shape Material Choices
3. Guide Sightlines & Lighting, Urban Policies



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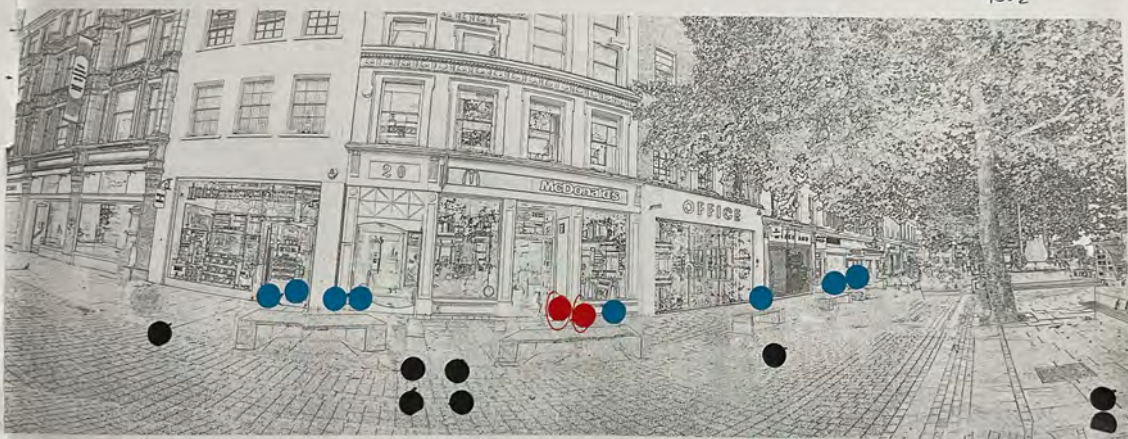


PLAYING

CHATING
 LOITERING
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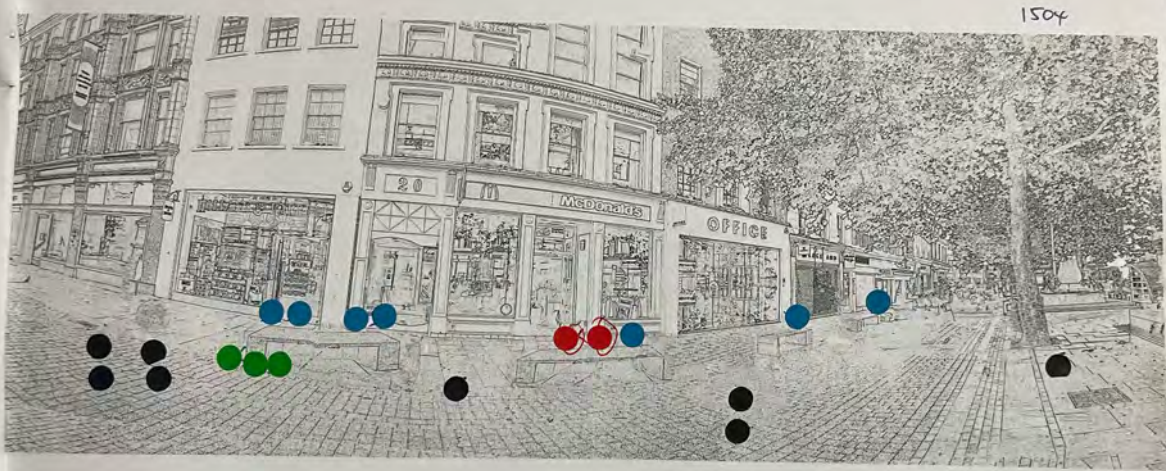
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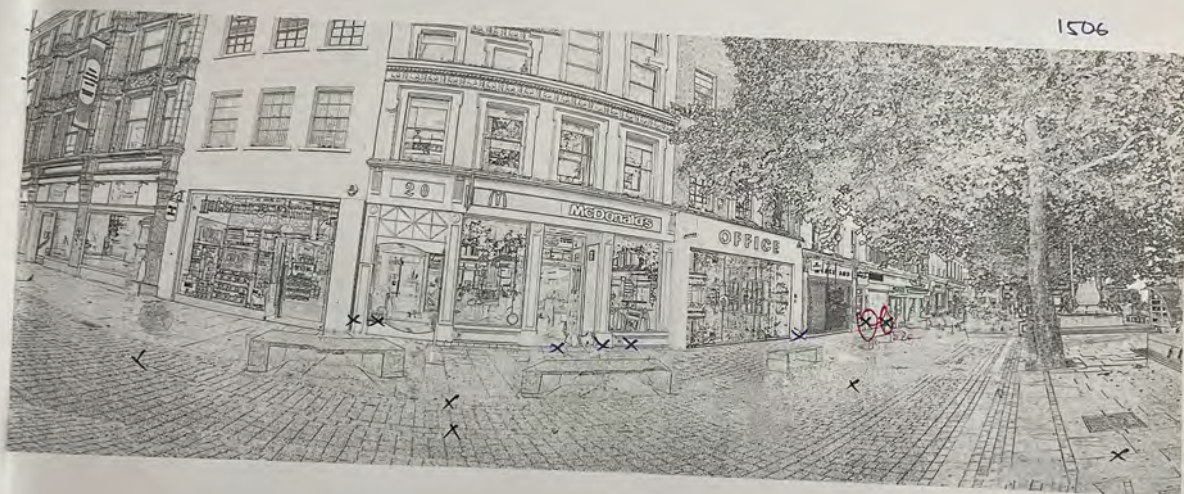


- SIT
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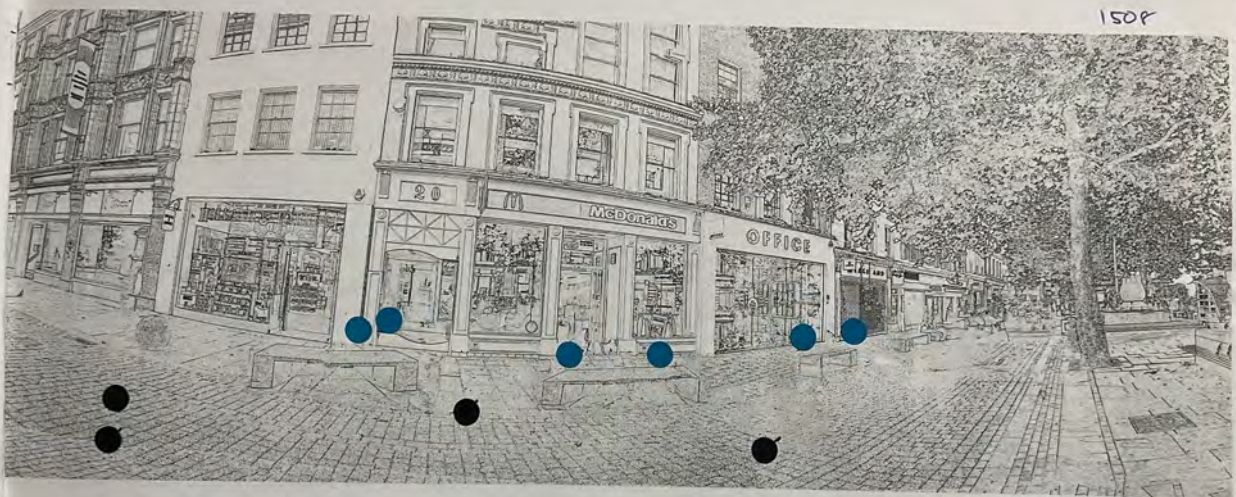
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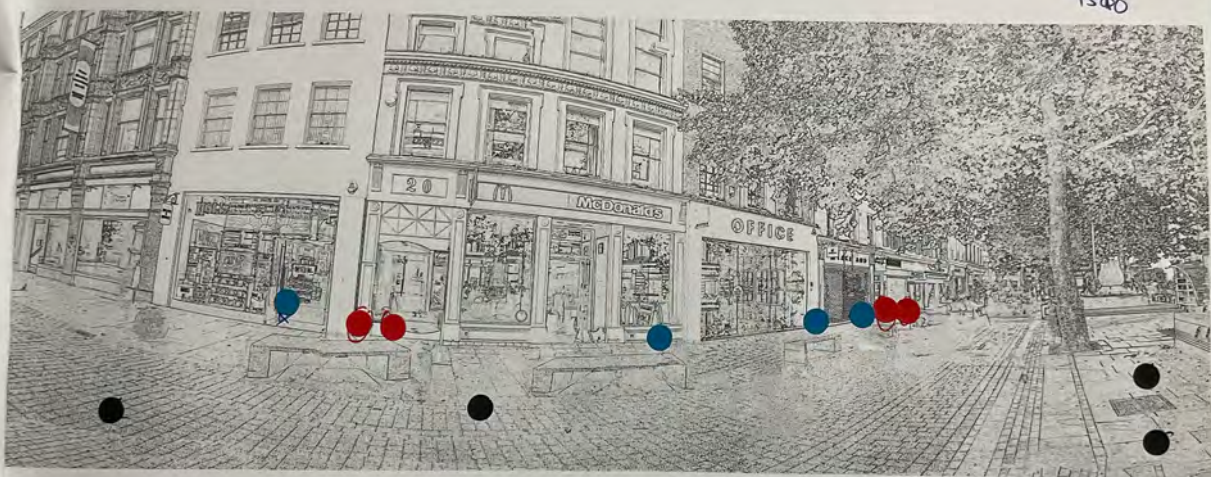
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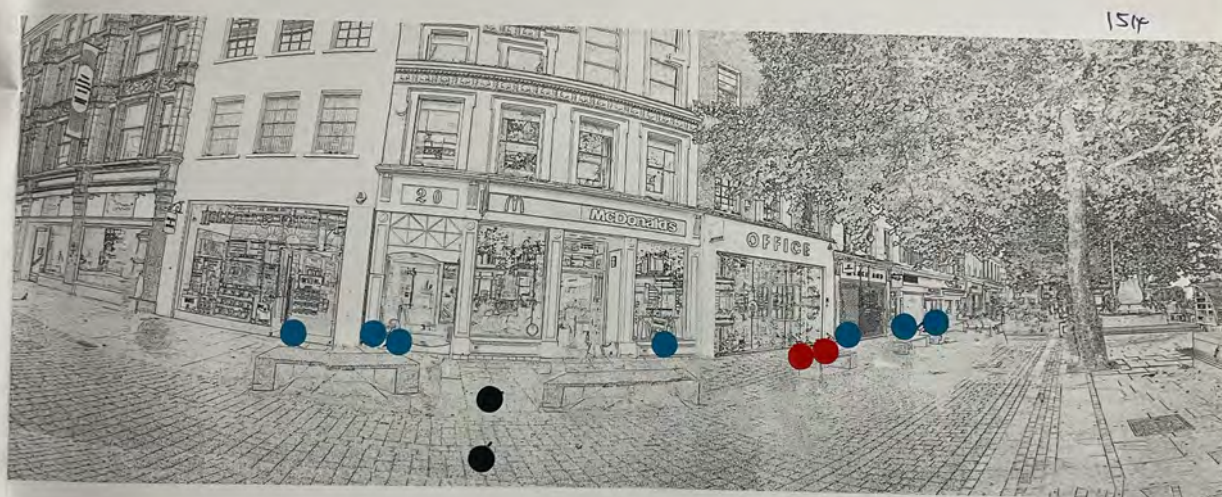
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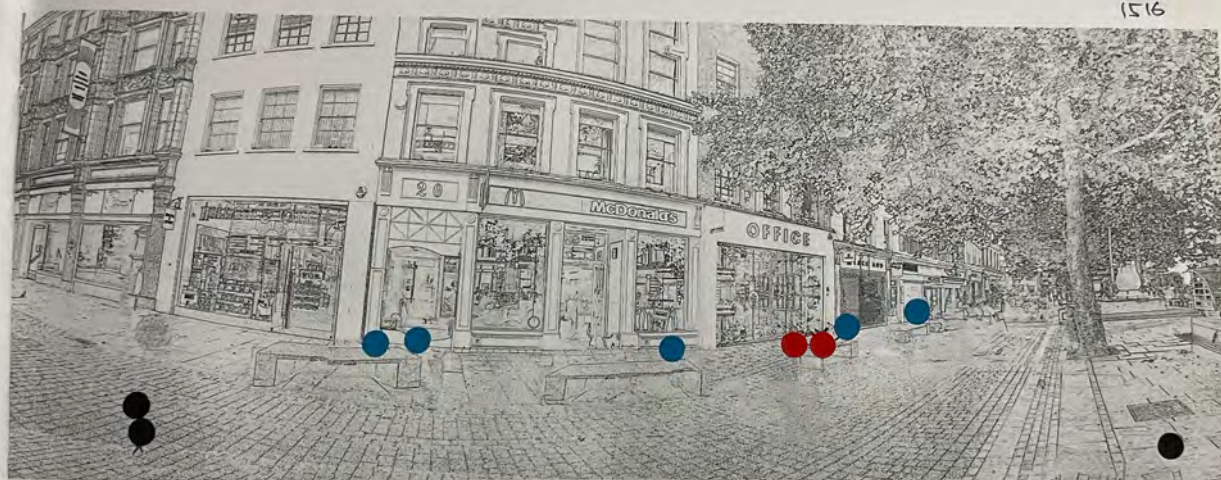
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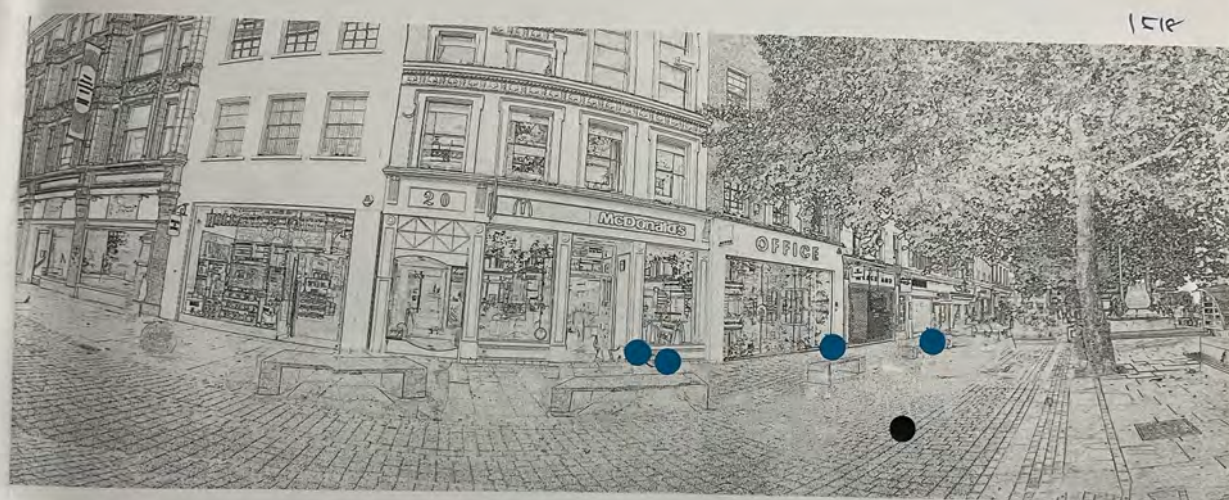
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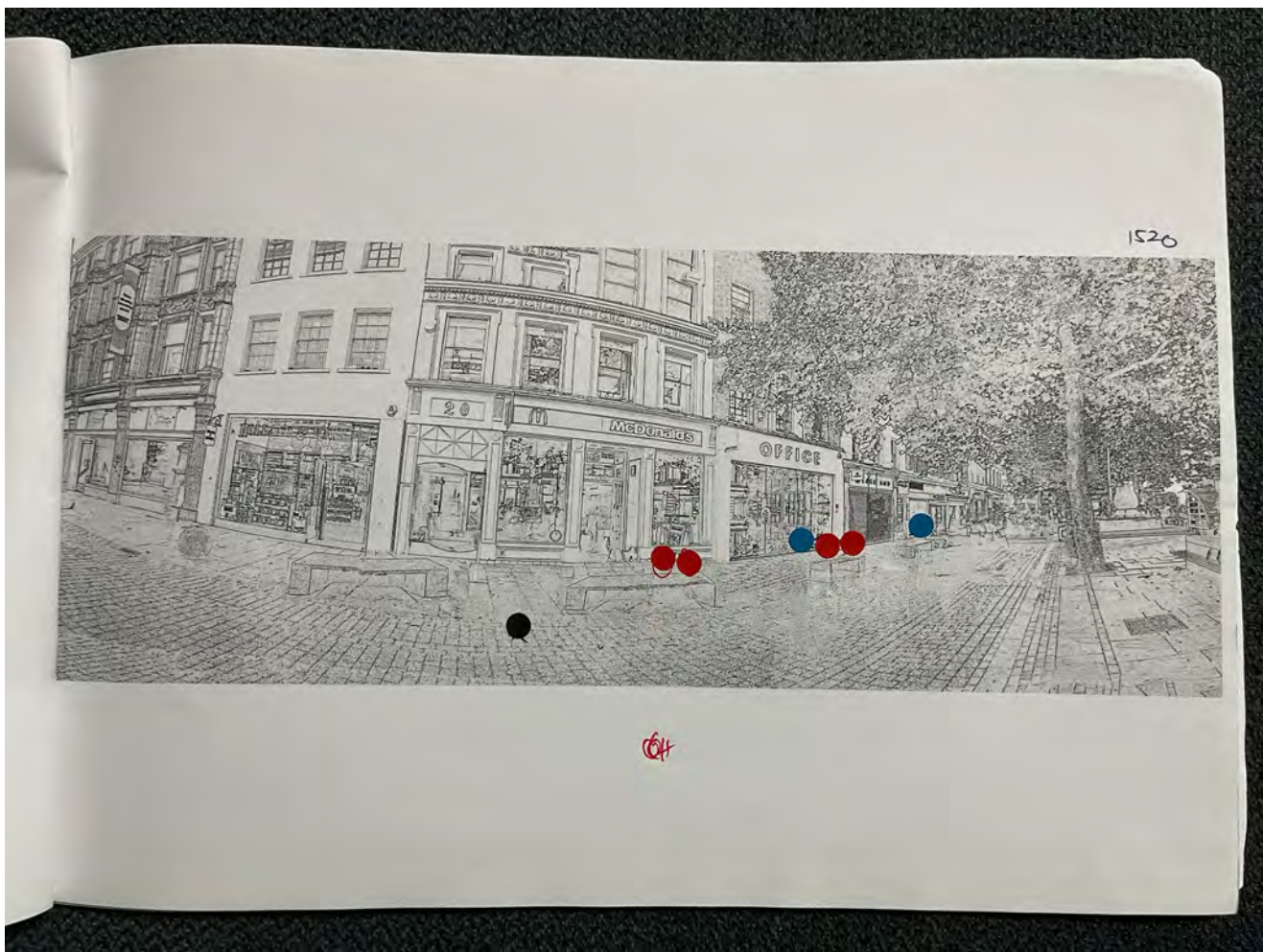
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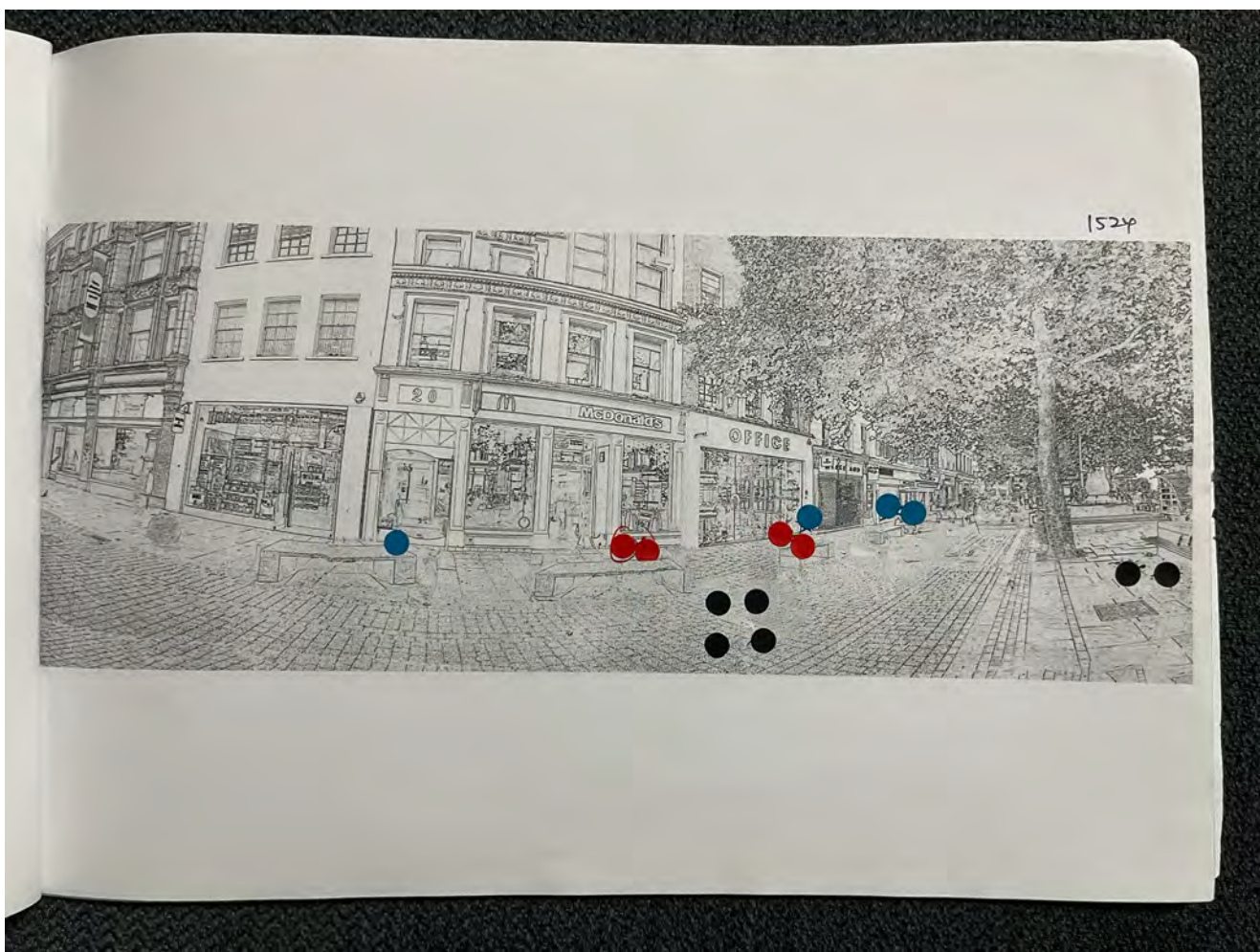
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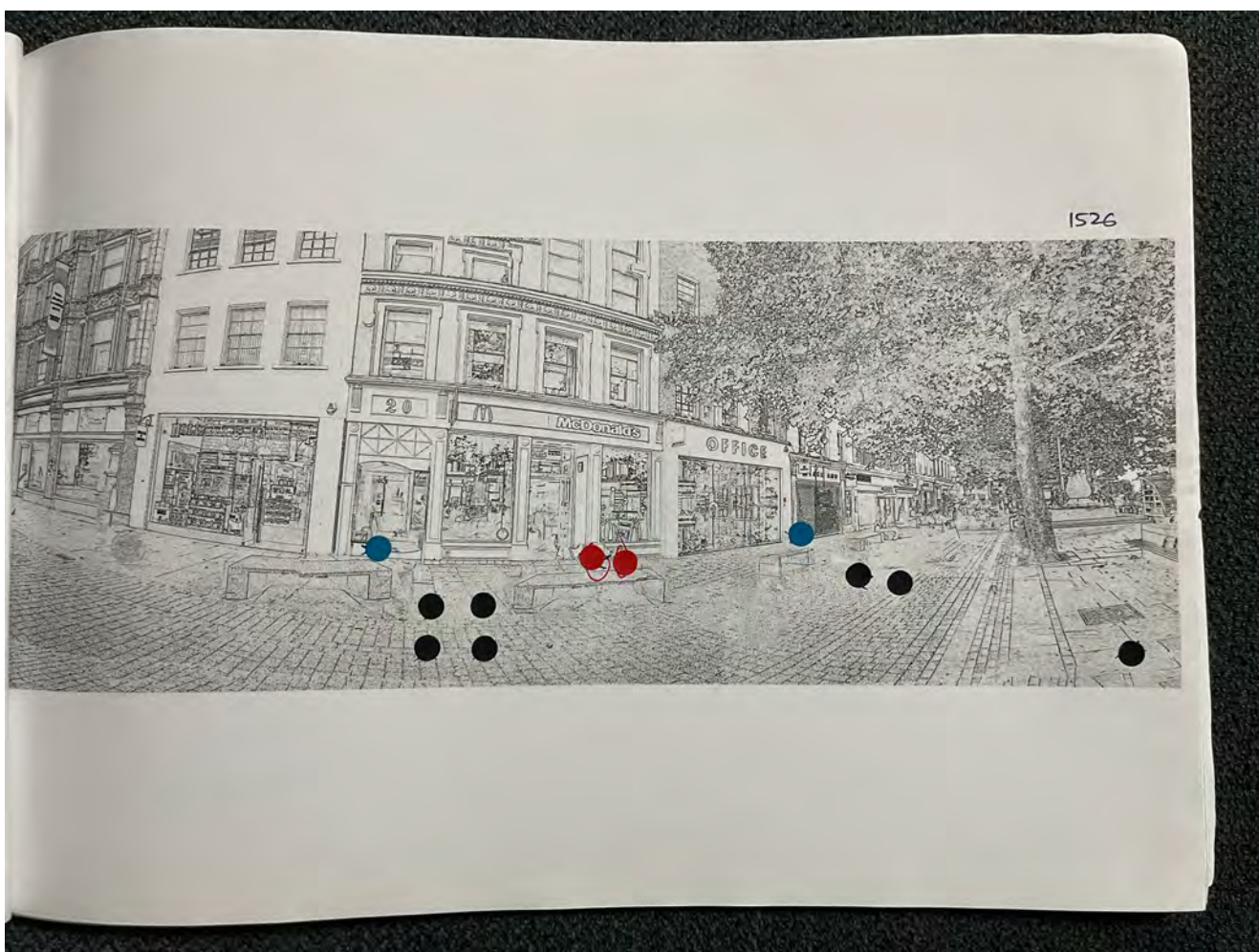
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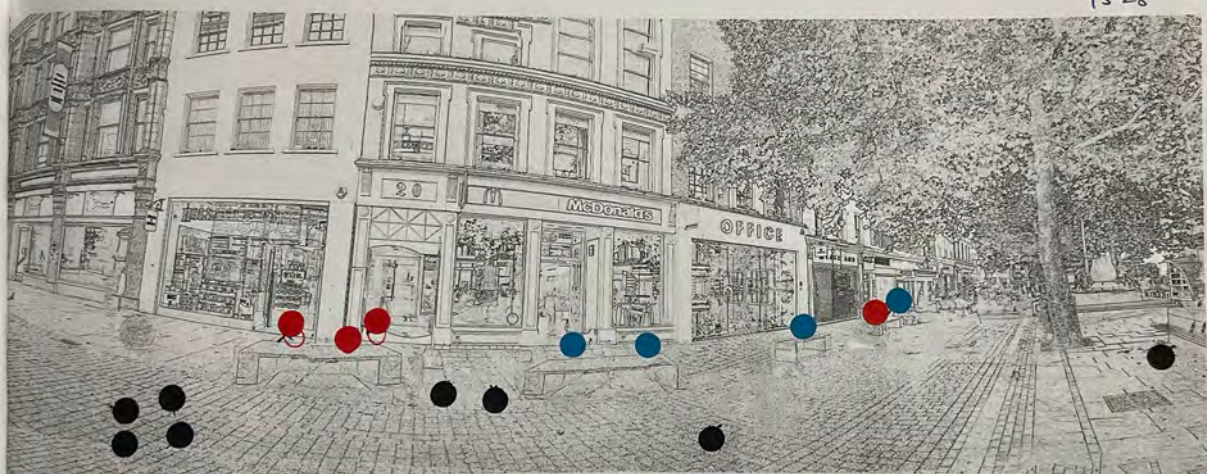
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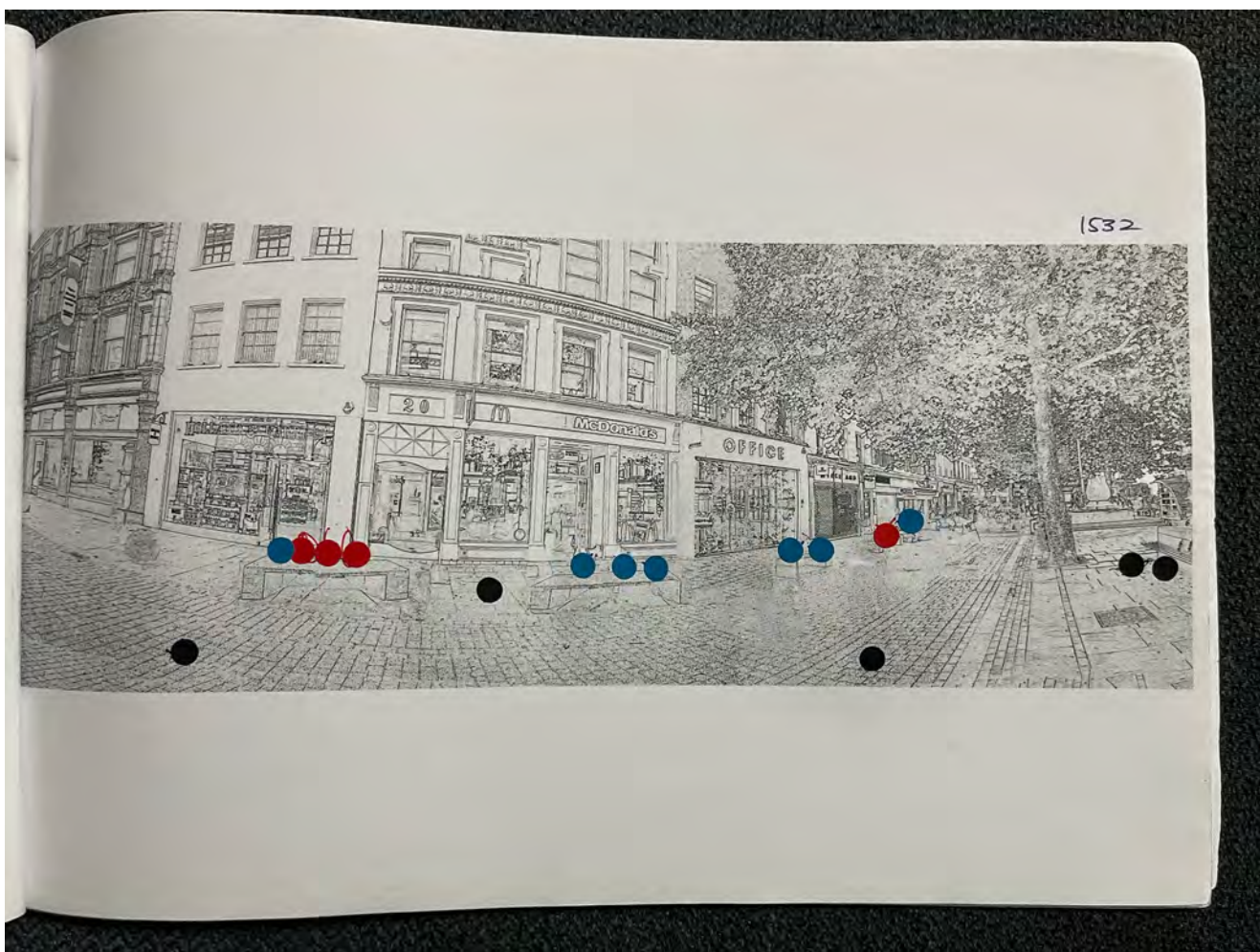


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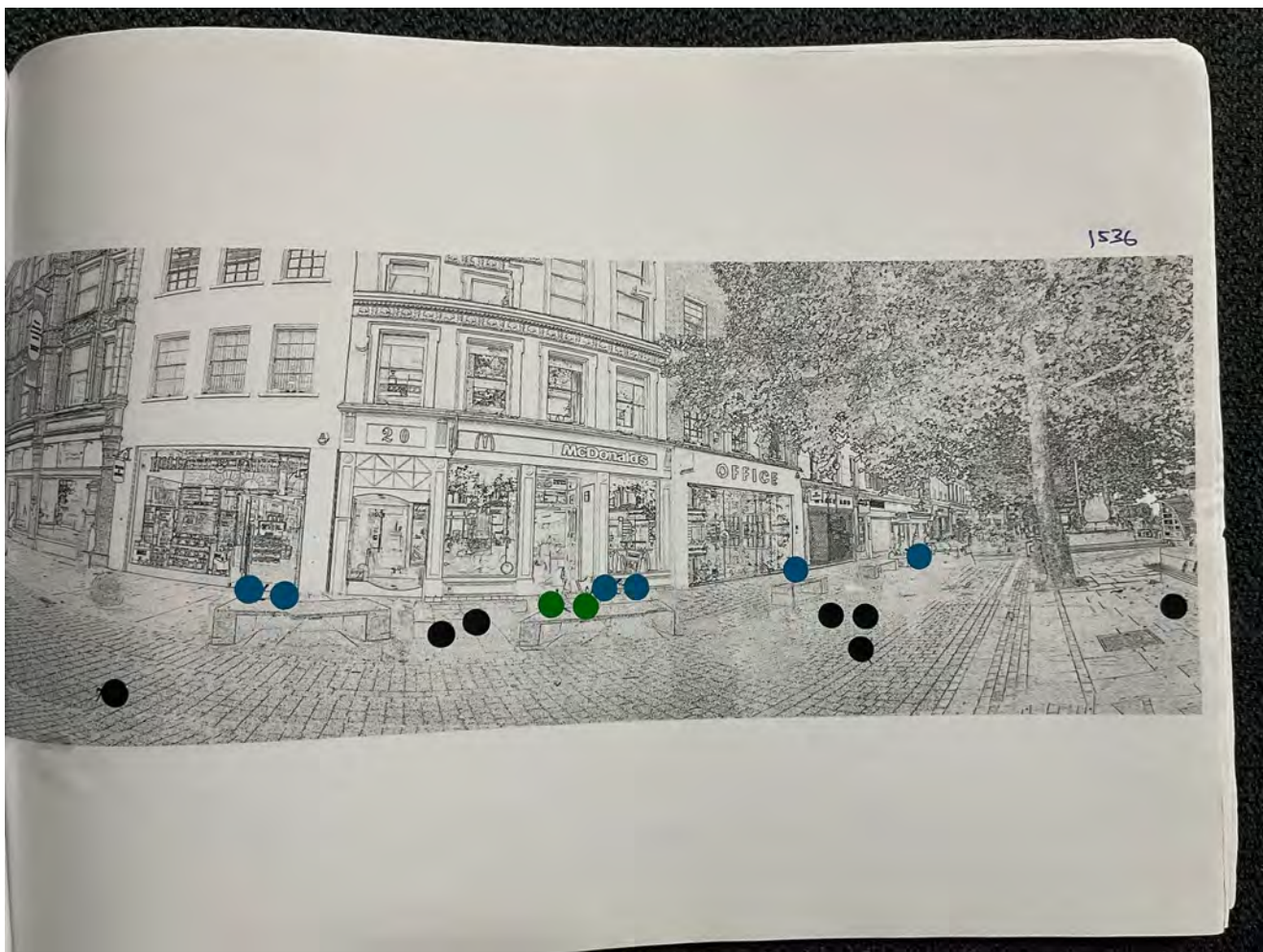
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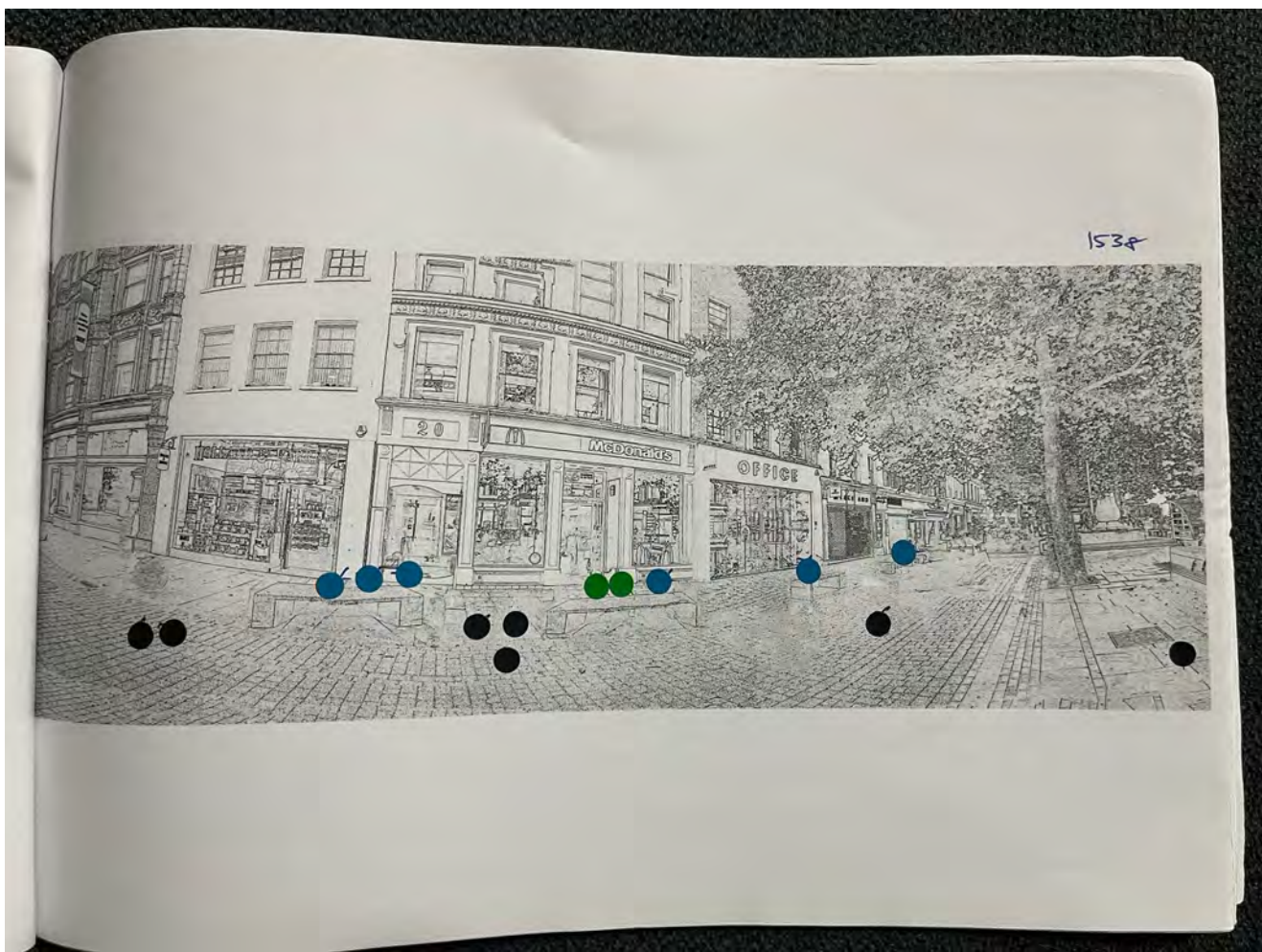
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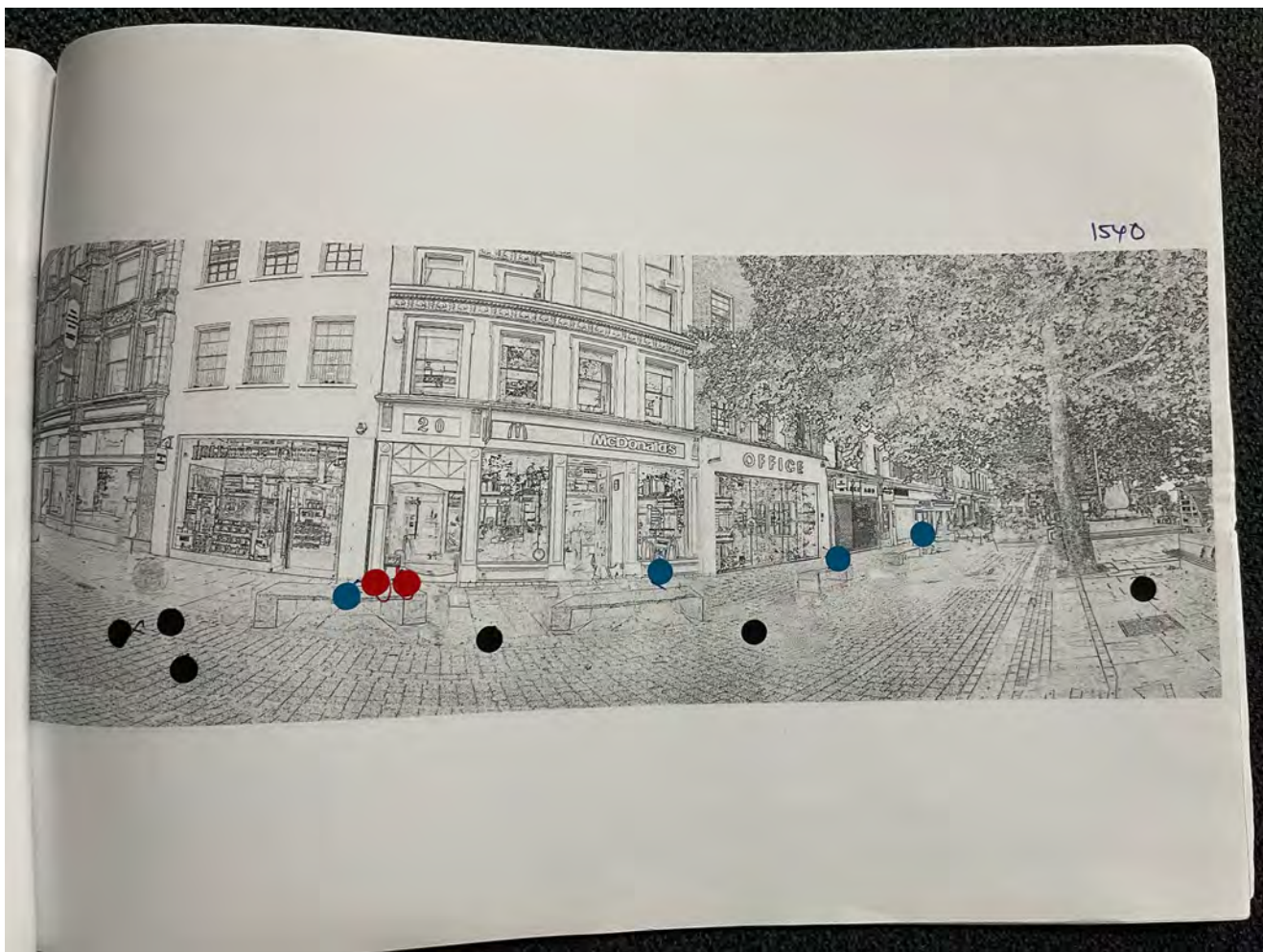
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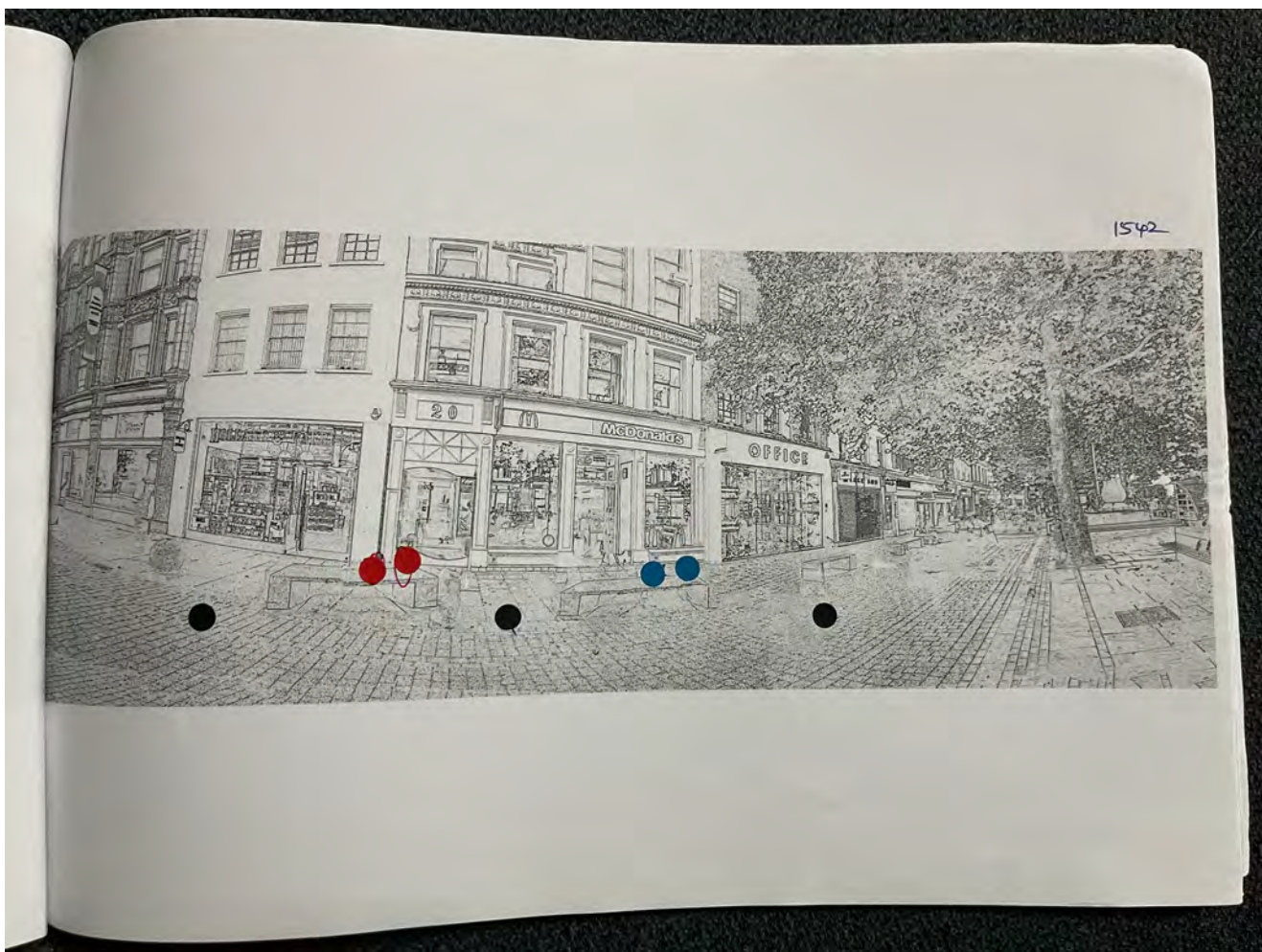
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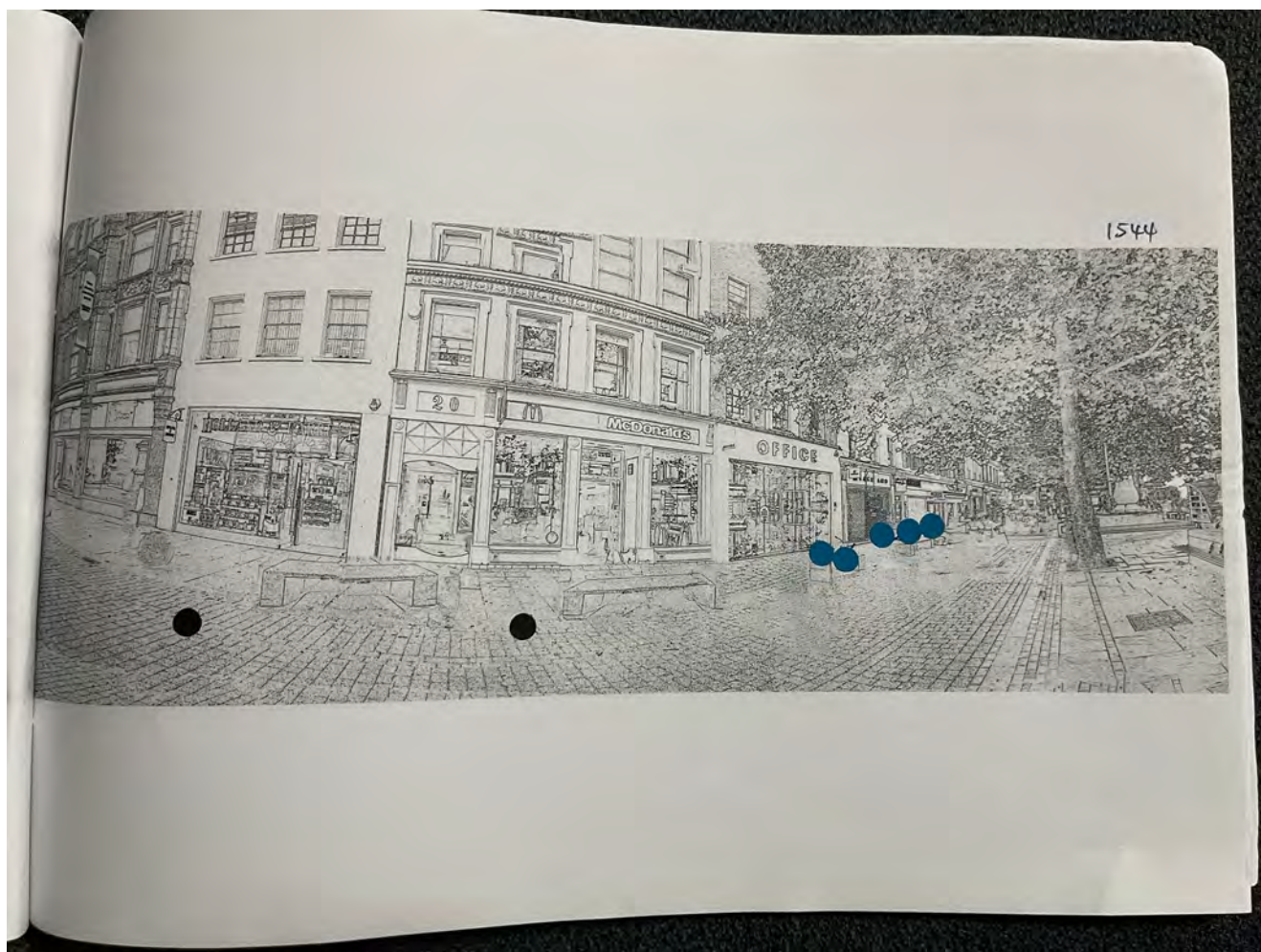
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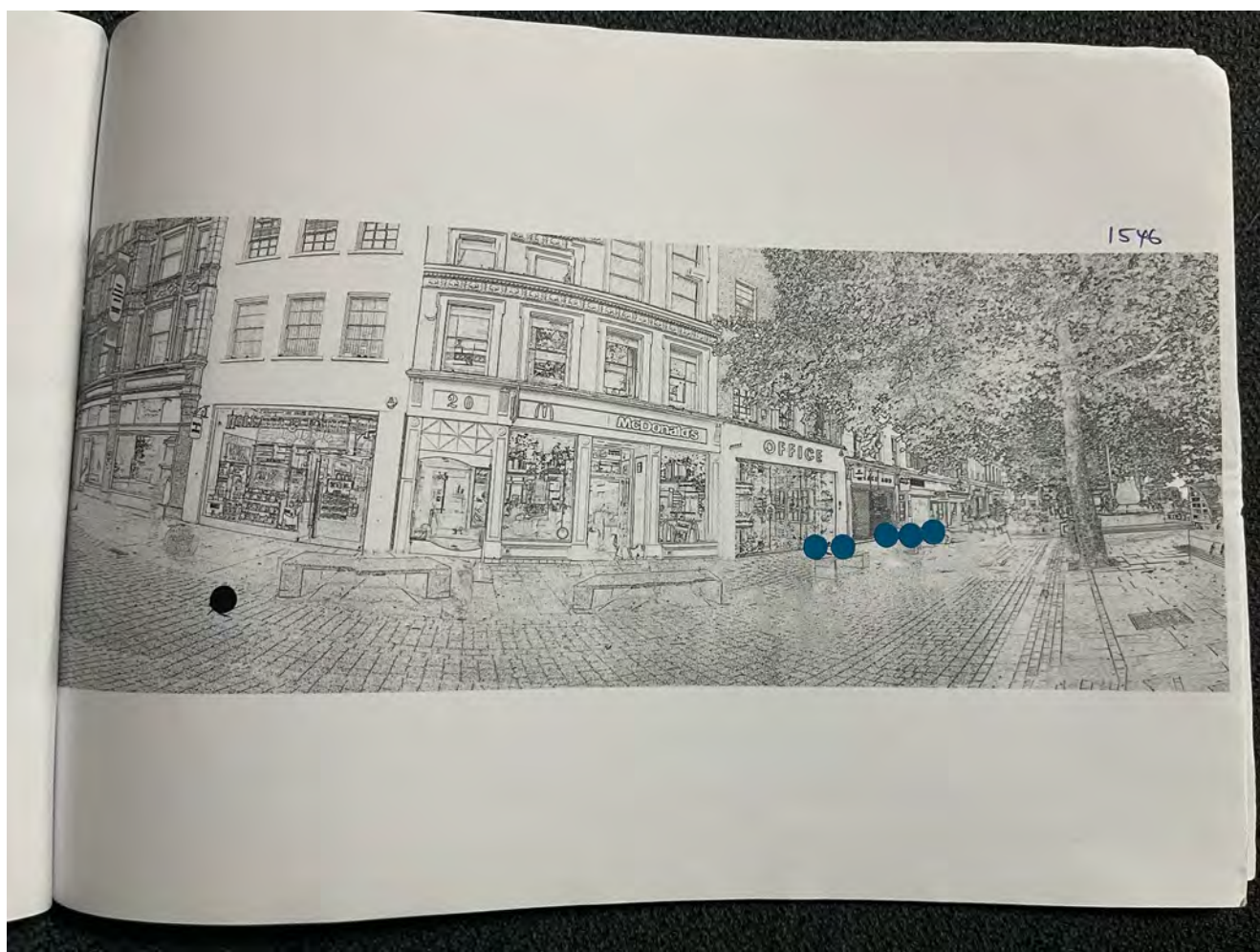
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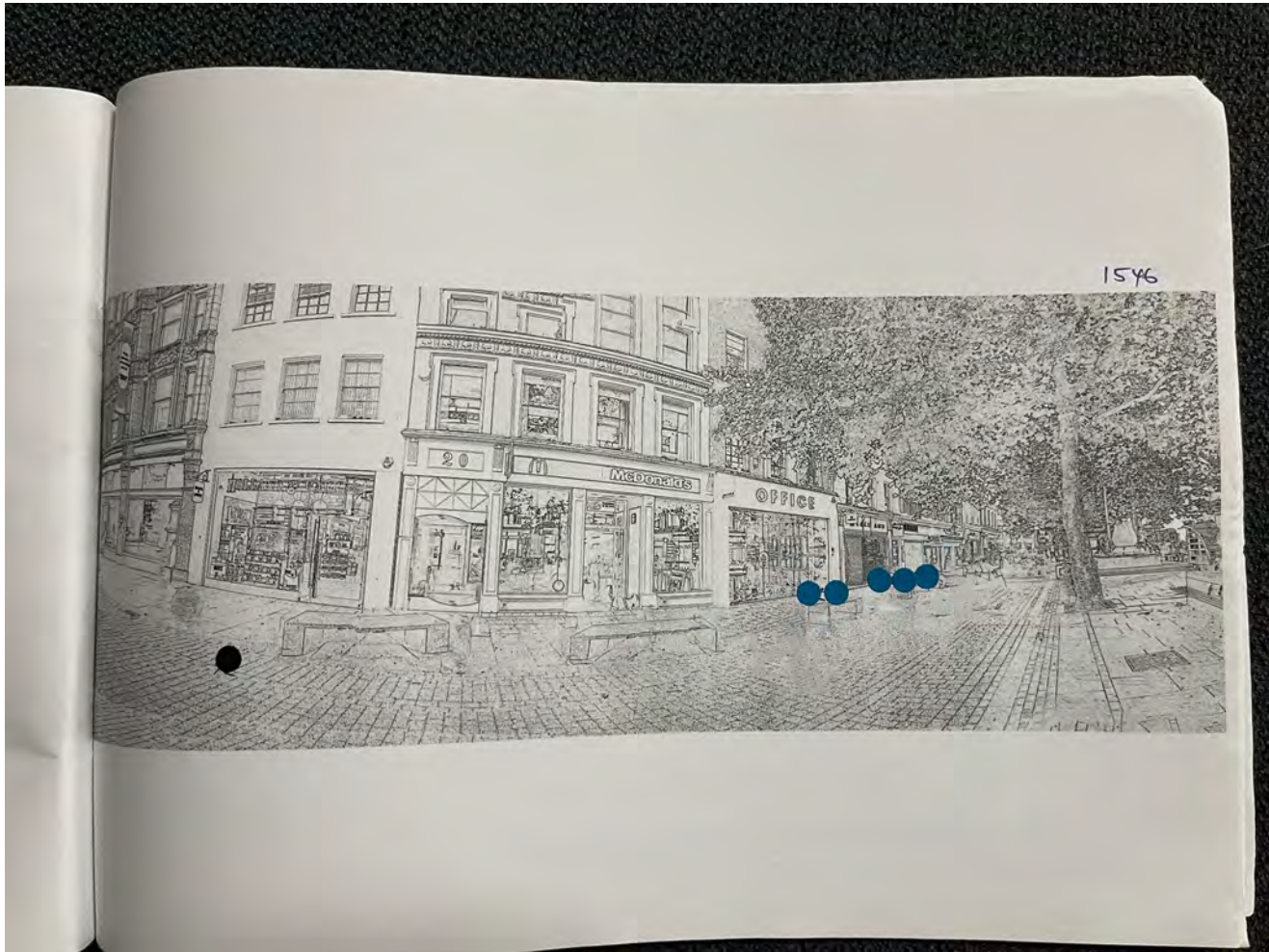
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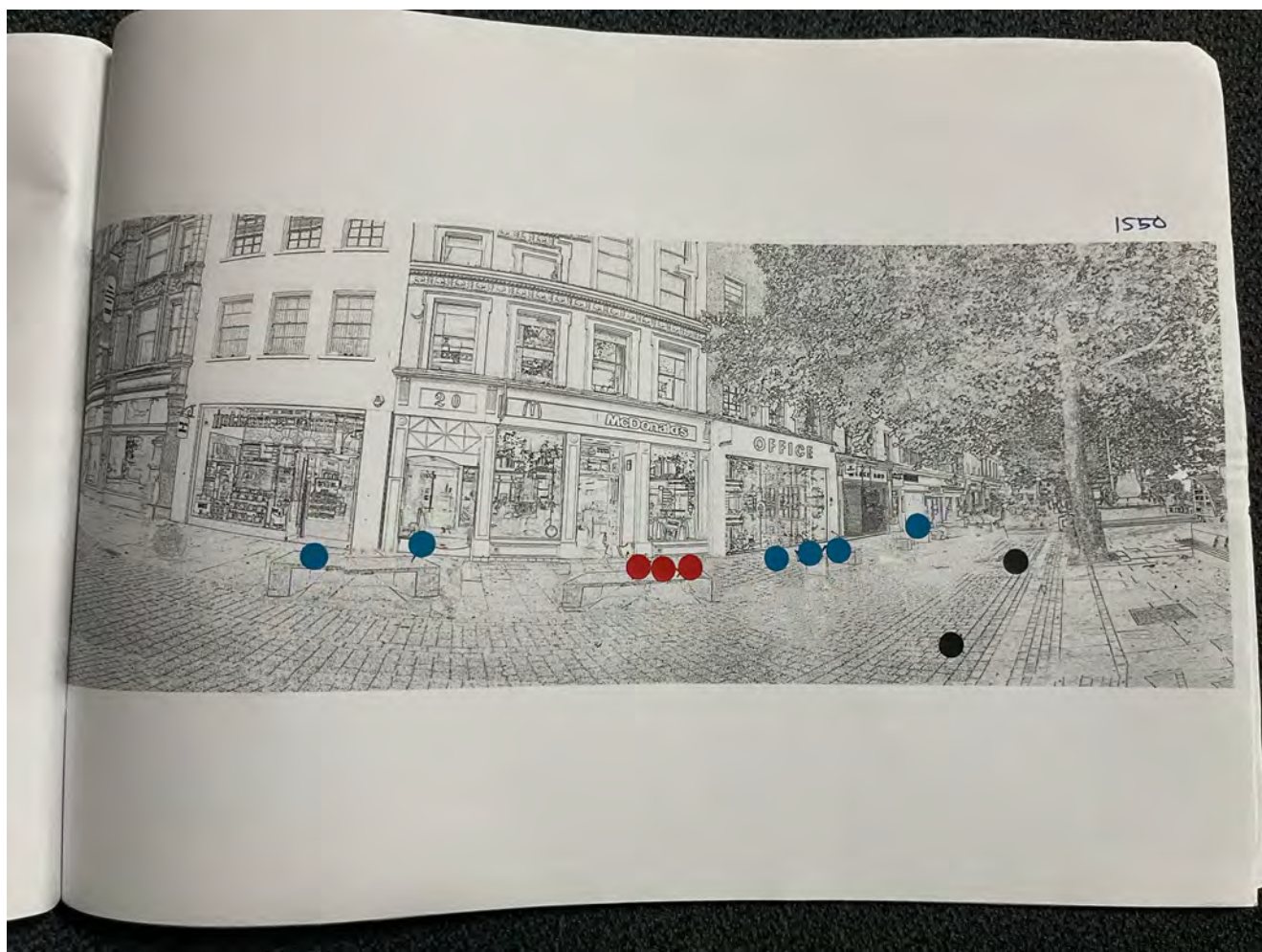


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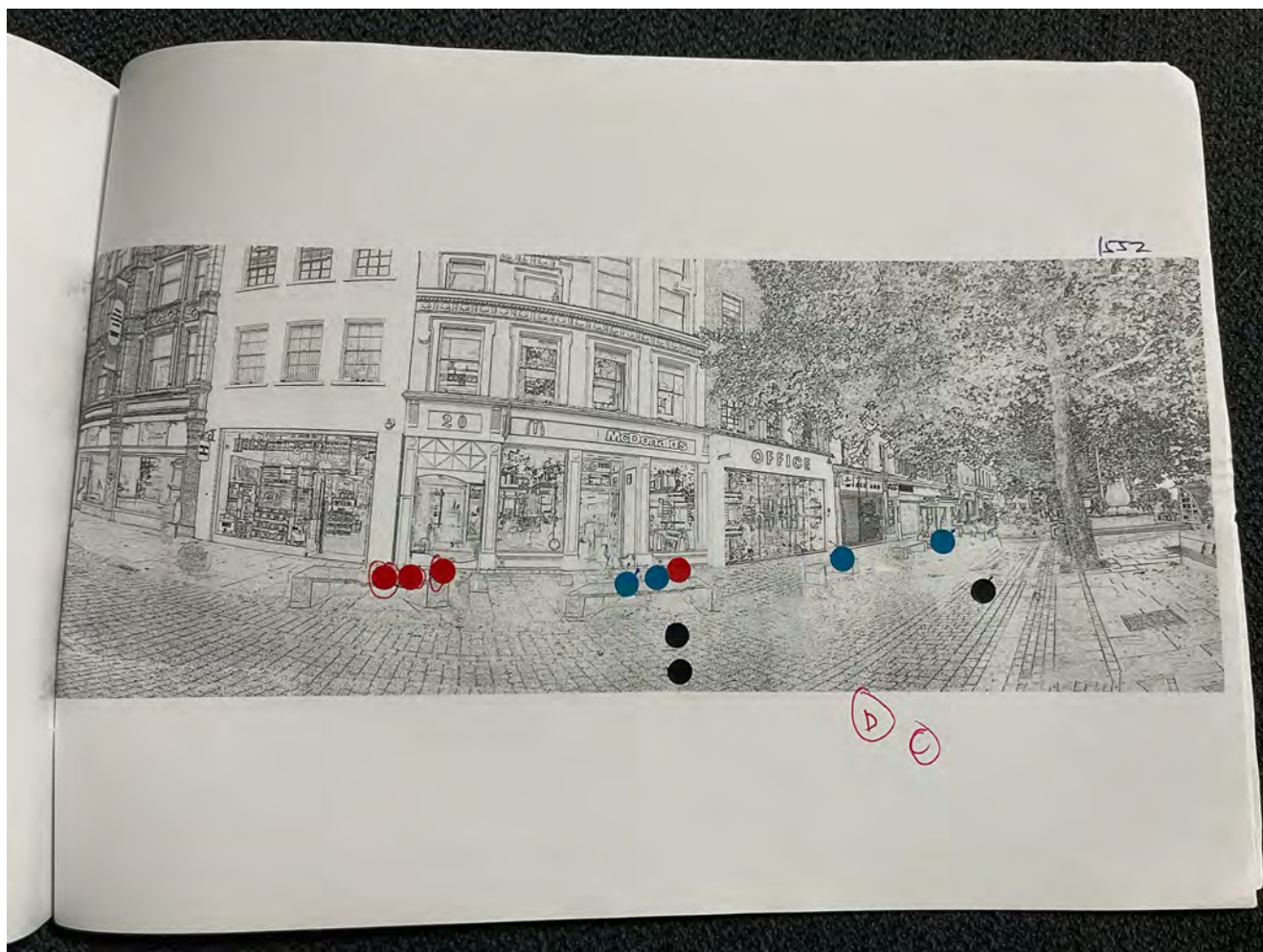


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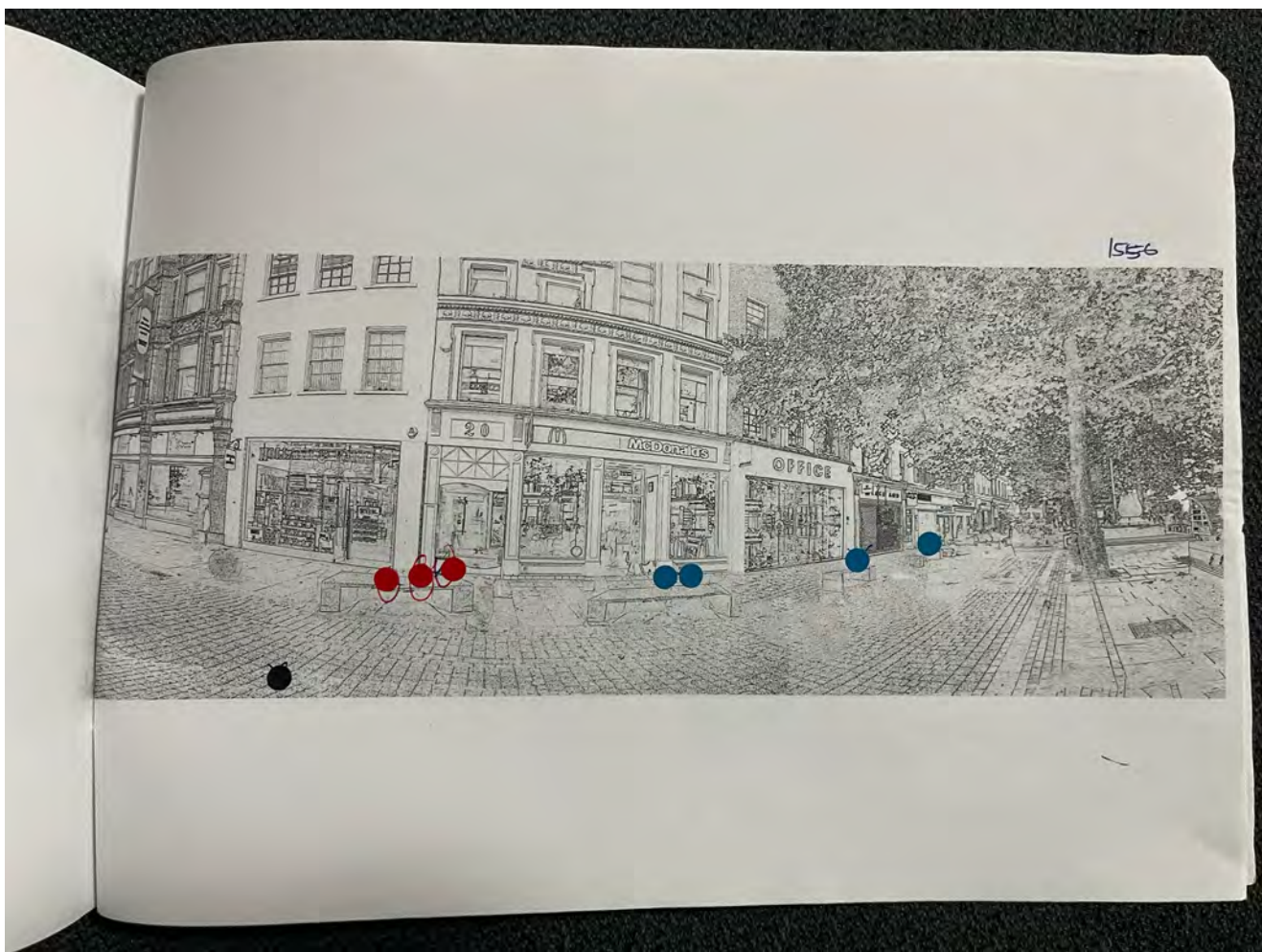
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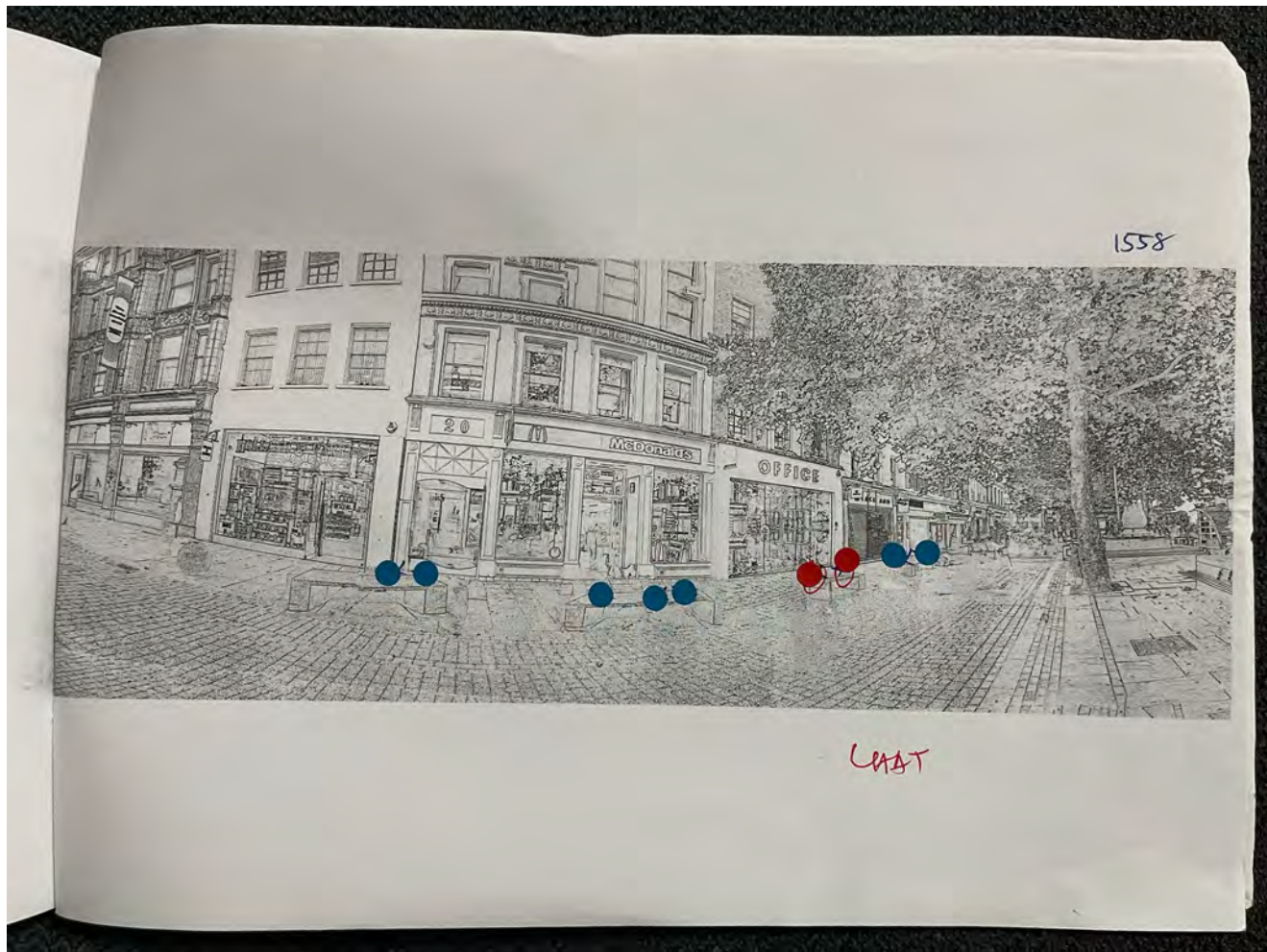
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